STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ADDENDUM NO. 2

for

INTERSTATE ROUTE H-1 ADDITION AND MODIFICATION OF FREEWAY ACCESS (KAPOLEI INTERCHANGE COMPLEX), PHASE 3

FEDERAL-AID PROJECT NO. NH-H1-1(271)

The following amendments shall be made to the Bid Documents:

A. NOTICE TO BIDDERS

Prospective bidders are hereby notified that receiving of sealed proposals scheduled for 2:00 P.M. HST, November 7, 2022, is hereby POSTPONED until 2:00 P.M. HST, FRIDAY, December 16, 2022. The attached NOTICE TO BIDDERS dated r10/28/22 shall be incorporated and made a part of the NOTICE TO BIDDERS.

B. SPECIFICATIONS

1. Replace Special Provision Section 411 dated 8/29/22 with the attached Special Provision Section 411 dated r10/28/22.

2. Replace Special Provision Section 603 dated 7/1/18 with the attached Special Provision Section 603 dated r10/28/22.

3. Replace Special Provision Section 605 dated 7/1/18 with the attached Special Provision Section 605 dated r10/28/22.

C. PROPOSAL SCHEDULE

1. Replace Proposal Schedule page P-8 to P-23 dated 9/13/22 with the attached revised Proposal Schedule page P-8 to P-23 dated r10/28/22.

D. PLANS

1. Replace Plan Sheets No. 8, 9, 23, 24, 26, 27, 28, 29, 34, 44, 47, 49, 50, 52, 53, 56, 61, 62, 73, 74, 81, 82, 84, 85, 87, 88, 89, 91, 92, 97, 99, 122, 124, 126, and 130 with the attached revised Plan Sheets No. ADD. 8, ADD. 9, ADD. 23, ADD. 24, ADD. 26, ADD. 27, ADD. 28, ADD. 29, ADD. 34, ADD. 44, ADD. 47, ADD. 49, ADD. 50, ADD. 52,

ADD. 53, ADD. 56, ADD. 61, ADD. 62, ADD. 73, ADD. 74, ADD. 81, ADD. 82, ADD. 84, ADD. 85, ADD. 87, ADD. 88, ADD. 89, ADD. 91, ADD. 92, ADD. 97, ADD. 99, ADD. 122, ADD. 124, ADD. 126, and ADD. 130.

2. Include Plan Sheet No. ADD. 156 which is intentionally left blank.

The following is provided for information.

E. ANSWERS TO QUESTIONS FROM PROSPECTIVE BIDDER

1. Attached are RFI's and responses for your information.

Please acknowledge receipt of this Addendum No. 2 by recording the date of its receipt in the space provided on page P-4 of the Proposal.

JADE T. BUTAY
Director of Transportation

NOTICE TO BIDDERS
(Chapter 103D, HRS)
Disadvantaged Business Enterprise

The receiving of SEALED BIDS for INTERSTATE ROUTE H-1 ADDITION AND MODIFICATION OF FREEWAY ACCESS (KAPOLEI INTERCHANGE COMPLEX), PHASE 3, FEDERAL-AID PROJECT NO. NH-H1-1(271), through HIePRO, scheduled for 2:00 P.M. Hawaii Standard Time (HST), November 7, 2022, is hereby POSTPONED UNTIL 2:00 P.M. HST, FRIDAY, December 16, 2022.

The submission of the Disadvantaged Business Enterprise (DBE) Contract Goal Verification and Good Faith Efforts (GFE) Documentation for Construction, Disadvantaged Business Enterprise (DBE) Confirmation and Commitment Agreement – Trucking Company and Disadvantaged Business Enterprise (DBE) Confirmation and Commitment Agreement –Subcontractor, Manufacturer, or Supplier for INTERSTATE ROUTE H-1 ADDITION AND MODIFICATION OF FREEWAY ACCESS (KAPOLEI INTERCHANGE COMPLEX), PHASE 3, FEDERAL-AID PROJECT NO. NH-H1-1(271), scheduled for 2:00 P.M. HST, November 14, 2022, is hereby POSTPONED UNTIL 2:00 P.M. HST, WEDNESDAY, December 21, 2022.

JADE T. BUTAY
Director of Transportation

Amend **Section 411 – Portland Cement Concrete Pavement** to read as follows:

SECTION 411 - PORTLAND CEMENT CONCRETE PAVEMENT

411.01 Description. This section describes constructing portland cement concrete (PCC) pavement, with or without reinforcement, on a prepared surface.

411.02 Materials.

Structural Concrete (minimum 14-day flexural strength, f_r = 650 psi)	601
Joint Filler	705.01
Joint Sealer	705.04
Reinforcing Steel	709.01
Curing Materials	711.01
Macro-Synthetic Fibers for Concrete Reinforcement	719

All concrete must comply with the concrete CO_2 footprint reduction requirements of Section 601 – Structural Concrete.

411.03 Construction.

(A) Jointing Plan. Submit the jointing plan for approval which includes types of joints, joint spacings, and location of joints.

(B) Paving Plan. Submit the paving plan no later than 30 days after the contract certification date. The paving plan must be complete and provide all information required. No partial submittal, except as noted, will be accepted. Partial submittals will be returned without review. The Engineer will review the paving plan in accordance with Subsection 105.04 – Review and Acceptance Process. Obtain acceptance of the paving plan from the Engineer before starting the test strip or any paving work including but not limited to any roadway excavation and subbase preparation and installation. The paving plan must include but not be limited to the following:

(1) Type, make, model, and the number of all equipment to be used for placing, finishing, curing, saw cutting, and diamond grinding of concrete pavement. Include a list of the equipment to be used and the number of equipment to be held in reserve in anticipation of breakdown. Provide the number of finishing bridges that will be used for thickness checking, finishing, and touch-up curing.

(2) Provide details of:

(a) Traffic control, methods to protect the public, workers, and work.

(b) Grade control methods for each operation. If low slump concrete is to be used list the method as to how required grades will be maintained.

(c) Repair of non-compliant areas

(d) PCC concrete placement, including but not limited to, proposed operational procedures, e.g., subgrade protection, delivery, or pumping, leveling, finishing methods, thickness checking, and texturing equipment. Dowel and tie bar placement method and equipment.

(e) How weather conditions detrimental to the PCC will be addressed. Rain, hot weather, wind, humidity, etc. must be monitored and addressed. Include the assumed temperature of concrete to be used in the initial calculation of the evaporation rate. Include action plans that are to be used should bad weather conditions, e.g., high wind, rain, high temperature, occur or will occur during pour and under what condition weather conditions must cause a cancellation or delay of the concrete placement. List make and model of weather monitoring instruments, to be used at the location of concrete placement, to measure the ambient air temperature, relative humidity, and wind velocity to determine the on-site real-time evaporation rate. All-in-one meters that utilize the ACI 305 chart or other accepted method for determining evaporation rate may be used if found acceptable by the Engineer.

(f) Curing means and methods, equipment, and curing materials. Method to be used to determine the application rate of the curing compound. The method of continuous agitation is used to keep the uniform distribution of pigment solids in the curing compound. Method to be used to maintain uniform and even paint-like finish spray pattern

(g) Saw cutting of PCC, list equipment, e.g., what brand and model of early-entry concrete saw will be used, the number of equipment, manpower. How it will be determined when to start cutting, how the proper saw blade will be chosen that will minimize raveling of the concrete during sawing of the joint, and the anticipated joint saw cutting rate.

(h) If applicable diamond grinding and grooving, equipment list, control of slurry, and debris. Slurry and debris pick up, disposal method, and disposal location.

(i) Construction operation sequence and location of panels/blocks and order they will be constructed.

(j) How block-outs for handholes, pull boxes, manhole frames, and covers, drain inlets, etc., in the PCC will be addressed including how the backfill around them will be accomplished the and dowel tie bar or reinforcing steel patterns.

(k) The saw cutting pattern plan. Indicate the location of areas where panels will be irregular in shape. The size of the plan sheet must be a minimum of 24" X 36". The Engineer may require larger or more detailed plans at no additional cost.

(l) List of ACI Certified Flatwork Finishers and Technicians and a copy of their certification. Refer to Section 411.03(U) Certified Concrete Flatwork Finisher Requirement below.

(m) List of material certifications, submittals, and required reports to be submitted and their tentative submittal schedule.

(n) AASHTO re:source (formally AMRL) certified material testing laboratory, must be used for all testing. Submit a list of testing methods to be provided, certifications for each test method of technicians, and the accreditation of the materials testing laboratory. If a commercial AASHTO re:source accredited material testing laboratory is not readily available on the island where the work is taking place the Engineer may allow a non-accredited AASHTO re:source material testing laboratory to perform the tests. Provide documentation that an accredited AASHTO re:source laboratory does not exist on the island and submit qualifications of the testing laboratory, calibration of test equipment documentation which will be used to perform the tests. The Engineer is not under any obligation to grant a waiver from using a non-accredited material testing laboratory or accept or consider valid any results from a non-accredited testing laboratory or non-certified technician. There will be no waiver granted by the Engineer for the use of non-certified technicians performing material tests. The Contractor is required to use due diligence in obtaining an accredited laboratory. Any delay or cost incurred by the Contractor in obtaining an AASHTO re:source accredited laboratory or certified technician must be borne by the Contractor. If the Contractor chooses to ship the samples to another island for testing, submit how the chain of custody of the samples will be maintained and how the samples will be protected from damage.

(o) Proposed concrete mix design, including expected strengths at 24 hours, 3, 7, 14, and 28 days. If the opening of pavement is to be

scheduled for a period other than the period stated in this paragraph, submit a test for that period to ensure the concrete will meet Contract requirements. The 24-hour break may be waived upon application for a waiver from the Engineer, however, no opening will be allowed at 24-hours if there are no tests performed. Submit test results of both a trial mix conducted by State-accepted testing laboratory using methods specified in Subsection 601.03(B) – Design and Designation of Concrete. Submit the ready-mix supplier's certification with the mix design that the concrete mix to be used for the slip-form placement had acceptable results for the Box Test as shown in Subsection 601.03.

(p) Other pertinent information or information requested by the Engineer

The Engineer will review the paving plan for compliance with the Contract Documents. Within 30 days after the paving plan receipt, the Engineer will notify the Contractor if the paving plan is acceptable or if additional information is required, or if there is a need for clarification, or a combination thereof. If applicable, make changes necessary to meet the requirements of the Contract Documents. The Engineer may reject parts of or the entire paving plan if found unacceptable. Resubmit the entire paving plan with changes and required explanations for re-evaluation within 30 days. The Engineer will have the same amount of time for the review of each resubmitted paving plan as it did for the original submittal. Submit the revised paving plan to the Engineer until it is acceptable. Any delay due to the paving plan not being acceptable is solely a Contractor's delay and no additional compensation or contract time will be granted. However, if the Engineer's review and response to the paving plan exceeds the 30 days allowed for the review of each version of the paving plan, additional time and compensation may be claimed. Additional time and compensation will be considered by the Engineer only if the activity is on the critical path. Procedural acceptance given by the Engineer is subject to trial in the field.

A meeting must be held a minimum of 10 working days before the anticipated date of the first pour of the Portland cement concrete pavement (PCCP). This pre-pour meeting must be attended by the contractor. Also, subcontractors, vendors, that are involved with PCCP work, and other personnel may be needed to answer questions about the PCCP work. The Engineer will attend and participate in the pre-pour meeting. This pre-pour meeting must not occur before the paving plan is accepted by the Engineer. No placement of the production PCCP or test strip must occur before the pre-pour meeting is held.

It is recommended that a post-pour meeting be held after the first production PCCP or test strip pour, to discuss what went right and what went wrong. This meeting is to improve the quality of the poured PCCP through

the discussion of lessons learned.

The meetings intend to clarify specifications, or the paving plan, or discuss potential problem areas, areas of concern, etc. The meetings are not to be used to modify or change the contract requirements. While this can be discussed at the meetings, changing the contract requirements will require a contract change order or field order.

All testing must be performed by an Engineer accepted laboratory and technician. All samples must be collected and performed by personnel certified in that test method. For samples that will be used to determine compliance and acceptance of the material; the Engineer will transport the Department's samples to the laboratory from the project site for testing. Provide help, e.g., labor, equipment, material, to Department personnel when requested. Provide storage, transport facility, or both for the samples for use in the Department vehicle. No sample of material taken without HDOT personnel being present and having full custody of the sample must be used to determine compliance with the Contract Documents and acceptance by the Department.

(B) Equipment.

(1) Batching Plant and Mixers. Batching plant and mixers must conform to Section 601 - Structural Concrete.

(2) Hauling Equipment. Hauling equipment must conform to Section 601 - Structural Concrete.

(3) Finishing Equipment.

(a) Finishing Machine. The finishing machine must be self-propelled and equipped with at least two oscillating-type, transverse screeds that must finish the surface to meet requirements specified in Subsection 411.03(N) - Surface Test and Subsection 411.03(T) - Pavement Thickness. Finishing equipment must not displace reinforcement, side forms, or joints.

(b) Vibrators. Vibrators for full-width concrete consolidation may be either internal-type, with an immersed tube or multiple spuds, or surface pan type. Vibrators must be attached to the spreader or finishing machine and must be mounted on a separate carriage. Vibrators must not come in contact with reinforcement, load transfer devices, subgrade, and side forms.

Furnish vibrators that operate at frequencies not less

than the following: 3,500 impulses per minute for surface vibrators; and 5,000 impulses per minute for internal and hand vibrators. Furnish tachometer for measuring and indicating vibration frequencies.

(c) Mechanical Floats. Mechanical floats must be self-propelled and designed to finish pavement surface uniformly smooth and true to grade. Run mechanical floats either on side forms or on adjacent lanes of concrete.

Floats must be constructed of hardwood, steel, or steel-shod wood and must be equipped with devices to permit adjusting the underside to a truly flat surface.

(d) Slip-Form Pavers. Slip-form pavers must be self-propelled and equipped with traveling side forms of sufficient dimensions, shape, and strength to spread, consolidate, and screed freshly placed concrete in one complete pass, with minimum hand finishing. Pavers must produce dense and homogeneous pavement, true to the cross-section and profile indicated in the Contract Documents.

Slip-form pavers must be equipped with high-frequency internal vibrators that vibrate concrete for full paving width and depth.

Vibrators may be mounted with their axes either parallel or normal to pavement alignment. Where vibrators are mounted with their axes parallel to pavement alignment, space vibrators at intervals not to exceed 2.5 feet, measured center to center. Where vibrators are mounted with their axes normal to pavement alignment, space vibrators such that lateral clearance between individual vibrating units does not exceed 0.5 feet.

While pavement is being spread, compacted, and shaped, operate vibrating units such that the longitudinal axis, at the center of each unit, is not more than 0.5 feet above the existing paving surface.

Paving operations may be conducted using either one machine or mechanical spreader followed by a separate finishing unit.

(4) Concrete Saw. If sawed joints are specified or elected by the Contractor, furnish power-driven concrete saws sufficient in number, power, and type of blade to cut joints. Provide at least one backup saw and replacement blades during concrete sawing operations.

Equip saws with blade guards and guides or devices to control alignment and depth. Remove all cuttings, slurry, and other by-products of the sawing operations from the work site.

(5) Forms. Use 10-foot-long straight side forms made of metal having a thickness not less than 7/32 inch, with a depth equal to prescribed pavement edge thickness, and base width not less than 80 percent of prescribed pavement thickness. Horizontal form joints will not be allowed unless built-up forms, as specified in this subsection, are accepted by the Engineer. Forms must be sufficiently rigid to prevent edge alignment distortion under subgrading and equipment loads or concrete pressure, or a combination thereof. Furnish form sections that are straight, free from bends, warps, indentations, and other defects. Sections that deviate from the true plane along the top of form more than 1/8 inch in 10 feet or along the face of form more than 1/4 inch in 10 feet will be rejected.

Join form lengths in a manner that ensures tight, leak-proof, neat joints at form connections and prevents springing from occurring under subgrading and paving equipment loads or concrete pressure, or a combination thereof. Built-up forms may be used by rigidly attaching sections of suitable width and thickness to either top or bottom of the form. If built-up is attached to the top of the form, use metal built-up.

For curves of a 100-foot radius or less, use flexible forms or curved forms having a proper radius. Special forms of wood or metal may be used for curved form lines having a radius of 200 feet or less. Five-foot-long, straight metal form sections may be used for curved form lines having a radius greater than 100 feet. Straight metal forms in sections 10 feet or less in length may be used for form lines having a radius greater than 200 feet.

Special forms of wood or metal may be used for curved form lines having a radius of 200 feet or less. Where use of standard pavement forms is not feasible, submit working drawings at least 10 working days before production. Five-foot-long, straight metal form sections may be used for curved form lines having a radius greater than 100 feet.

Use of wood forms as a track for operating paving and finishing equipment will not be allowed.

(C) Preparing the Proper Grade. Trim beyond edges of proposed concrete pavement to accommodate forms and slip-form paving equipment. Fill and compact areas that are below established grade with subgrade or base course material, in lifts up to 1/2 inch, for widths of 18 inches on both

sides of form base. Tamp and trim areas above-established grade, as necessary.

(D) Setting Forms. Before placing forms, compact foundation to ensure continuous contact with forms. Set forms and check for correct line and grade before placing concrete. Tamp inside and outside edges of form base. Use three pins for each 10-foot section to stake forms in place. Place pins on each side of every joint. Lock form sections to prevent play or movement in any direction. Forms must withstand impact and vibration due to consolidation operations and must remain true to within 1/4 inch. Before placing concrete, clean and coat forms with form release agent or oil, accepted by the Engineer. At least one working day before placing concrete, notify the Engineer that the forms are ready for inspection. Check for compliant thickness by doing a test run using all the equipment that will be used to place and finish the concrete for the pavement.

(E) Conditioning of Subgrade or Base Course. Unless waterproof cover material is indicated in the Contract Documents, keep subgrade and base course uniformly moist before placing concrete.

(F) Handling, Measuring, and Batching Materials. Handle, measure, and batch materials in accordance with Section 601 - Structural Concrete.

(G) Mixing Concrete. Mix concrete in accordance with Section 601 - Structural Concrete.

(H) Mixing Limitations and Water Supply. Provide adequate natural or artificial lighting when mixing, placing, finishing, and sawing concrete.

Place mixed concrete only when the concrete temperature is between 50 and 90 degrees F. Use Plastic Shrinkage Evaporation Chart ACI 305 and Section 503 as the method to determine if additional precautions should be taken to prevent shrinkage cracks.

Before placing concrete pavement, provide an adequate supply of water for the entire work period. Inadequate water supply will be sufficient cause for delaying or stopping mixing operations. If there is a water supply deficiency, give first water-use priority to curing concrete already placed before using water for mixing concrete.

(I) Placing, Consolidating, and Shaping Concrete.

(1) General. Make advance arrangements for preventing a delay in concrete delivery and placement. An interval of more than 30 minutes between the placement of two consecutive batches or loads must constitute a cause for stopping paving operations and requiring a construction joint to be placed. Such a construction join must be

installed at no increase in the contract price or contract time, at the location and of the type ordered by the Engineer.

Conditioning of Subgrade or Base Course. Unless waterproof cover material is indicated in the Contract Documents, keep subgrade and base course uniformly moist before placing concrete i.e., leave aggregate surfaces used as the subgrade or base course in a cool, nearly saturated surface dry (SSD) condition. The subgrade or base course must be kept within 15 degrees of the anticipated concrete temperature to minimize thermal shock and cracking. For placement surfaces that are formed, e.g., bridge deck, keep form temperature within 15 degrees of the anticipated concrete temperature.

Before placing concrete, demonstrate proper adjustment of screeds and floats on slip-form pavers by measurements from grade stakes driven to known elevations. Placement of concrete must not start until this is done. Demonstrate satisfactory operation and adjustments of propulsion and control equipment, including pre-erected grade and alignment lines, by running slip-form pavers and finishing machines over the entire length of prepared subgrade or base course with propulsion and control equipment fully operational and loaded.

Unless otherwise indicated in the Contract Documents, construct pavement in full-lane widths separated by longitudinal weakened plane joints, or monolithically in multiples of full-lane widths, with longitudinal weakened plane joints at each traffic lane line.

Deposit concrete with minimum handling. Spread concrete uniformly over the entire area between forms, without segregation, using a mechanical spreader. Where hand methods are necessary due to pavement design, equipment breakdown, or other factors, use shovels, not rakes, for hand spreading. Place concrete continuously between transverse joints without using intermediate bulkheads. Prohibit workers from walking in concrete with boots or shoes coated with earth or foreign substances.

Improperly proportioned concrete will be rejected. Remove and dispose of concrete rejected by the Engineer in accordance with Subsection 201.03(E) - Removal and Disposal of Material, at no increase in the contract price or contract time.

Spread, consolidate, and shape concrete so that the completed pavement will comply with the thickness and cross-sectional requirements indicated in the Contract Documents. Sides of

pavement may be constructed with batter not exceeding one horizontal to six vertical, provided that pavement top width is maintained as indicated in the Contract Documents.

Where widening PCC pavement contiguous with existing parallel concrete pavement not constructed as part of the contract, spread, consolidate, and shape concrete so that completed pavement will comply with the thickness and cross-sectional requirements indicated in the Contract Documents and to the following:

(a) Elevation of completed pavement surface must be such that water will not pond on either side of the longitudinal joint with the existing pavement.

(b) New pavement surface at longitudinal joint must conform to the elevation of the existing concrete pavement. If necessary, provide a smooth transition between new and existing pavement by hand-finishing new pavement within one foot of existing pavement, adding or removing concrete, as necessary.

(c) Transverse straightedge, longitudinal straightedge, and Profile Index requirements specified in Subsection 411.03(M) - Final Strike-Off, Consolidation, and Finishing and Subsection 411.03(N) - Surface Test will not apply to pavement surface within 1-foot of existing concrete pavement unless in the opinion of the Engineer the surface finish of the installed concrete pavement exhibits poor workmanship, e.g., the finished surface is rougher than the existing surface, the roughness of the surface cannot be attributed to the existing concrete pavement.

(d) Profiles of completed pavement surface specified in Subsection 411.03(N) - Surface Test will not be required within one foot of a longitudinal construction joint with existing concrete pavement unless, in the opinion of the Engineer, the surface finish of the installed concrete pavement exhibits poor workmanship, e.g., the finished surface is rougher than the existing surface, the roughness of the surface cannot be attributed to the existing concrete pavement.

(e) Thickness measurements specified in Subsection 411.03(T) - Pavement Thickness will not be made in pavement within one foot of existing concrete pavement.

(f) Transverse weakened plane joints must be constructed in pavement widening to match the spacing and skew of

weakened plane joints in the existing pavement.

Where concrete is to be placed adjacent to previously constructed pavement, keep mechanical equipment off previously constructed pavement until that concrete pavement has attained flexural strength of not less than 550 pounds per square inch when tested in accordance with AASHTO T 97.

Where concrete is being placed adjacent to existing pavement, provide that part of equipment supported on existing pavement, with protective pads on crawler tracks or rubber-tired wheels; and offset bearing surface to run a sufficient distance from pavement edge to avoid breaking or cracking that edge.

(2) Stationary Side Form Construction. Provide enough forms so that no delay occurs due to the lack of forms. Spread, consolidate, and shape concrete by one or more machines. Use machines that uniformly distribute and consolidate concrete without segregation, so that completed pavement conforms to the cross-section indicated in the Contract Document, with minimum handwork.

Furnish paving machines in sufficient number and capacity to finish work at a rate equal to that of concrete delivery.

Consolidate concrete for full paving width using surface or internal vibrators, or by another method of consolidation that produces equivalent results without segregation.

Operate vibrators at the manufacturer's recommended frequencies based on compatibility with pertinent factors, including the following: mix design, concrete slump, paver speed, and vibrator spacing. Vibration amplitude must be sufficient to be perceptible on the concrete surface more than one foot from the vibrating element.

Do not rest vibrators on new pavement or side forms. Connect power to vibrators so that vibration ceases when the forward or backward motion of the machine is stopped.

(3) Slip Form Construction. Slip form paving equipment must spread, consolidate, and screed freshly placed concrete to produce dense, homogeneous pavement, true to cross-section and profile, with minimum handwork.

Use reference lines outside the finished concrete limits to regulate paver alignment and elevation during concrete placing and finishing operations. Abrupt changes in longitudinal alignment will not be allowed. Limit horizontal deviation to no more than 0.1 foot from

alignment established by the Contract Documents.

Coordinate operations of mixing, delivering, and spreading concrete to allow slip-form paving equipment to operate in continuous forward movement, with minimal stopping and starting. When paver forward movement is stopped, immediately cease vibrating and tamping operations. Do not apply tractive force to the paving machine except that which is controlled by the machine.

Consolidate concrete for full paving width using high-frequency vibrators. Operate vibrators at the manufacturer's recommended frequencies based on compatibility with pertinent factors, including the following: mix design, concrete slump, paver speed, and vibrator spacing. Vibration amplitude must be sufficient to be perceptible on the concrete surface along the entire length of vibrating units and for a distance of at least one foot therefrom.

(J) Test Specimens. Furnish concrete necessary for casting test beams and cylinders and for testing air and slump. Unless otherwise indicated in the Contract Documents, furnish, maintain, and clean beams or cylinder molds, or both. Beams or cylinder molds, or both must conform to AASHTO R 100, Standard Practice for Making and Curing Concrete Test Specimens in the Field.

Cure beams, as specified for pavement, in accordance with AASHTO R 100 For early opening to traffic, cure flexural test specimens at the same time and in the same manner as pavement.

Additional flexural strength test specimens will be required due to concrete placement conditions or to determine concrete strength where the early opening of pavement to traffic is dependent on concrete strength test results.

(K) Striking-Off Concrete and Placing Reinforcing Steel. After placement, strike off concrete to the cross-section indicated in the Contract Documents.

Where pavement is placed in two layers, strike off and consolidate the bottom layer to a depth necessary to place fabric or reinforcing steel mat directly on concrete. Support reinforcing steel as needed to maintain its correct position.

Place the top layer within 30 minutes of the first layer, or remove and replace the lower layer with freshly mixed concrete.

Where pavement is placed in one layer, position reinforcing steel before placing concrete.

For reinforcing steel, Subsection 602.03(B) - Storage, Surface Condition, and Protection of Reinforcement must apply.

(L) Joints. Construct joint faces normal to the pavement surface, as indicated in the Contract Documents. Use chalk line, string line, sawing template, or other methods to provide true joint alignment. Before contract acceptance, maintain joints free of soil, gravel, concrete or asphalt mix, and other foreign material except for filler material.

Where sawing method is used to cut pavement grooves, use a saw complying with Subsection 411.03(B)(4) - Concrete Saw. Saw joints before uncontrolled shrinkage cracking occurs, but only after concrete has hardened sufficiently to prevent excessive tearing or raveling, or both during sawing operations. Determining concrete readiness for sawing transverse contraction and longitudinal joints in accordance with requirements specified herein must be the Contractor's responsibility. Cut grooves to the minimum width possible for the type of saw used, but limit groove width to 0.02 feet.

Once sawing has commenced for any day's concrete placement, continue sawing for 12 hours after placement. Should sawing fail to be completed within 12 hours of concrete placement, limit subsequent concrete placements to quantities that can be sawed in 12 hours. Restore curing membrane disturbed during sawing operations by spraying disturbed areas with additional curing compound.

(1) Longitudinal Joints. Place deformed tie bars, two-piece connectors accepted by the Engineer, and smooth dowels, as indicated in the Contract Documents, perpendicular to the longitudinal joint. Deformed tie bars and two-piece connectors must be 30 inches long, Grade 60 No. 5 bars, placed 30 inches apart at mid-depth of the slab. Where deformed tie bars are to be bent and later straightened, use Grade 40 bars. Place bars using mechanical equipment, or secure bars with chairs or other supports in accordance with Section 602 - Reinforcing Steel. Use other required sizes, grades, lengths, and spacings, based on slab width, thickness, and type of underlying base.

Unless otherwise indicated in the Contract Documents, tie bars may be inserted into plastic concrete. If this method results in tie bar misalignment, poor consolidation around tie bars, concrete surface or edge slumping, or a combination thereof, discontinue using this method and complete work using other methods accepted by the Engineer.

Construct longitudinal joints by sawing method at traffic lane lines in multilane, monolithic concrete pavement. Cut longitudinal joint

to minimum depth d = t/3, where:

d = minimum depth of cut rounded up to nearest 0.01 feet.
t = greatest pavement thickness (feet) in each lane.

Where adjacent lanes are constructed separately, use deformed tie bars or smooth dowels, as indicated in the Contract Documents. Two-piece connectors accepted by the Engineer may be used.

Clean all joint faces of any curing compound, primer or any material that may be deleterious to the bonding of the new concrete to the existing or previously poured concrete.

(2) Transverse Expansion Joints. Extend transverse expansion joint to the full cross-section of PCC pavement and install a continuous piece of preformed joint material. When installing a joint filler, depress filler 1/2 inch below the pavement surface.

Hold expansion joint filer in a vertical position and limit deviation to not more than 1/4 inch from a straight line along the centerline of the joint. Hold filler on line with metal channel. Remove channel after initial concrete set.

(3) Transverse Contraction Joints. Construct transverse contraction joints by forming or sawing grooves on the pavement surface. Where indicated in the Contract Documents, include dowel bars and assemblies.

Transverse contraction joints may be formed by depressing a tool or device into plastic concrete before the initial concrete set.

If uncontrolled shrinkage cracking occurs during or before joint sawing, modify sawing sequence accordingly or use other methods accepted by the Engineer. If necessary to eliminate uncontrolled shrinkage cracking, add more sawing units or use early entry concrete cutting machines with special blades that cut through relatively fresh concrete without needing water. Where transverse crack occurs before sawing and any point on crack is within 5 feet of planned transverse contraction joint, omit sawing the planned joint.

Unless otherwise indicated in the Contract Documents, construct groove between depths of 1/3 to 1/4 of pavement thickness.

(4) Construction Joints. When concrete placement is interrupted for more than 30 minutes, construct longitudinal and transverse construction joints in accordance with the Contract Documents.

Placement of a construction joint within 10 feet of another transverse joint will not be allowed. At the time of interruption, if sufficient concrete has not been mixed to form a slab greater than 10 feet long, remove and dispose of concrete back to the preceding joint, at no increase in the contract price or contract time. When concrete placement is stopped, provide a bulkhead having sufficient cross-sectional area to prevent deflection, notched to receive dowels, and shaped to pavement cross-section. The bulkhead must be placed perpendicular to the baseline and must also be one straight across the entire width of the pavement.

(5) Dowels for Longitudinal, Transverse, Expansion, and Contraction Joints. As indicated in the Contract Documents, provide smooth, straight dowels, conforming to Subsection 709.01(E) - Dowels; and deformed dowels conforming to Subsection 709.01(F) - Tie Bars.

At transverse joints, space dowels in the pavement at one-foot centers, parallel to the pavement surface and traffic direction.

Use joint assemblies or wire baskets that remain in the pavement to hold dowels in place during concrete placement and finishing. For referencing, properly mark the center of dowel assembly on both sides of the pavement slab.

For expansion joints, unless otherwise indicated in the Contract Documents, use dowels with one end of each coated dowel encased in a cap conforming to Subsection 709.01(E)(2) - Joint Dowels.

Place dowels in the pavement with alignment tolerance of ±1/4 inch per dowel and depth d = t/2, where:

d = minimum depth, rounded up to the nearest 0.01 feet.
t = pavement thickness (feet) in each lane.

Maintain dowel position and arrangement when placing and consolidating concrete around dowels.

Unless otherwise indicated in the Contract Documents, coat the entire length of each dowel with de-bonding material accepted by the Engineer. At the Contractor's option, dowels may be lightly coated with grease accepted by the Engineer. Use of cutback asphalts, emulsions, or oils will not be allowed for coatings.

(M) Final Strike-Off, Consolidation, and Finishing.

(1) Sequence. Sequenced operations are as follows: strike-off,

consolidate, float, remove laitance, straightedge, and perform final surface finish. Provide work bridges and other equipment necessary to reach pavement surface to inspect, straightedge, finish, and perform corrective work as necessary.

Finish concrete surface without adding water to the surface.

(2) Finishing at Joints. Strike-off, consolidate, and finish, in a manner that does not damage or misalign, or both, joint assemblies, load transfer devices, and other embedded items. Vibrate concrete mechanically next to joints without creating voids or segregation, or both.

If finishing operation causes segregation, damage, joint misalignment, or a combination thereof, stop finishing equipment when the screed is approximately 8 inches from the joint. Remove segregated concrete surrounding the joint. Lift front screed and set it directly over joint before continuing forward motion. Lift and carry a second screed over the joint when it is close enough to force excess mortar over a joint. If segregation is prevented, subsequent finishing over the joint without lifting screeds will be allowed.

(3) Machine Finishing.

(a) Nonvibratory Method. Use finishing equipment to strike off, screed, and texture concrete immediately after it is distributed or spread. Avoid excessive finishing. Keep top of forms free of concrete and debris.

Maintain uniform ridge of concrete along entire paving width and ahead of screed during the first pass of finishing machine.

(b) Vibratory Method. Vibrators for full-width vibration of concrete paving slabs must comply with Subsection 411.03(B)(3)(b) - Vibrators. When uniform and satisfactory concrete density is not obtained by the vibratory method, furnish other equipment and methods that produce pavement conforming to the contract. Where not in conflict with provisions in Subsection 411.03(M)(3)(a) – Nonvibratory Method, provisions for vibratory method, must govern.

(4) Hand Finishing. Use hand-finishing methods only under the following conditions and locations:

(a) When mechanical equipment breaks down, stop concrete placement and hand-finish concrete already in place.

(b) In areas of narrow widths or irregular shapes, hand-finish those areas that cannot be finished by mechanical equipment.

(c) Hand floating in other portions of the Contract Documents must be performed.

Use portable screed to strike-off and screed concrete. Provide a second portable screed to strike off the bottom concrete layer when placing reinforcing steel during two-layer concrete placement.

Use metal screed or metal-reinforced screed, which is at least 2 feet longer than the widest part of the slab to be placed.

Consolidate concrete with a hand-operated vibrator.

Move screed along forms in forwarding motion that combines longitudinal and transverse shearing motion without raising either end from side forms. Repeat this strike-off process until pavement is true to grade and cross-section, and surface texture is uniform and free of porous areas.

(5) Floating. After striking off and consolidating concrete, use float to finish the surface to specified grade and smoothness. Use one of the following methods:

(a) Hand Method. Use hand-operated, longitudinal float at least 12 feet long and 6 inches wide and sufficiently rigid to retain its shape. Operate longitudinal float from footbridges. Work float in a sawing motion while holding it in a position parallel to the road's centerline and passing it gradually from one side of the pavement to the other.

Move ahead along the pavement centerline, advancing not more than one-half of float length. Waste excess water and laitance over side forms on each pass.

(b) Mechanical Method. Adjust tracks and float to the required crown. Coordinate float with adjustments of transverse finishing machine so that a small quantity of mortar is maintained ahead of the float. Operate float over the pavement a few times and at such intervals as is necessary to produce a surface of uniform texture. Excessive operation over a given area will not be allowed. Waste excess water and laitance over side forms on each pass.

(c) Alternate Mechanical Method. Use equipment with cutting and smoothing float or floats, suspended from and guided by a rigid frame mounted on four or more visible wheels. Maintain constant contact of all four wheels with forms.

After mechanical floating, use the hand method to fill open-textured areas in the pavement or if the method does not provide an acceptable finish.

(d) Slip-Form Finishing. Construct pavement with preliminary float finish using devices incorporated in slip-form paver. Suitable machine floats may be used to supplement the finish achieved by the slip-form paver.

Before concrete has hardened, correct pavement edge slump, exclusive of edge rounding, over 0.02 feet.

(6) Evaporation Retarders and Finishing Aids – See Subsection 503.03(F)(8).

(7) Addition of Water at the Project Site – See Subsection 503.03(F)(1).

(8) Straightedge Testing and Surface Correction. After completing floating and removing excess water and laitance, correct surface irregularities while concrete is plastic. Fill, strike-off, consolidate, and refinish depressions. Cut down and refinish high areas. Smooth surface across joints to tolerances indicated in the Contract Documents.

Test concrete surface for trueness using a 12-foot straightedge swung from a handle that is 3 feet longer than one-half of slab width. Hold straightedge in contact with the surface in successive positions parallel to the road's centerline. Test entire pavement width, moving from one side of the slab to the other, as necessary. Advance testing operation along the road, in successive stages of not more than one-half straightedge length.

(9) Final Finish. After the surface sheen has disappeared, texture the pavement surface without tearing it. Texture final surface using artificial turf drag followed immediately by metal comb grooving device (tining). The use of the metal comb is not needed if the surface requires mechanical texturing, e.g., grooving, Next Generation Concrete Surface (NGCS).

Use artificial turf made of molded polyethylene with synthetic turn blades measuring approximately 3/4 inches long and containing

approximately 5760 individual blades per square foot. Submit a sample of artificial turf at least five working days before production.

Attach artificial turf to self-propelled equipment having external alignment control. The device must be a separate piece of equipment to be used exclusively for texturing operation and must not be attached to other paving-train equipment. Artificial turf must be full pavement width and of sufficient size that during finishing operation, approximately 2 feet of turf, parallel to pavement centerline, is in contact with the pavement surface across the width of the pavement. Maintain downward pressure on pavement surface with turf, to achieve uniform texturing without measurable variations in pavement profile.

Grooving (tining) with a metal comb must include a single line of randomly spaced, tempered spring steel tines of size and stiffness sufficient to produce grooves of specified dimensions in plastic concrete without edge slumping and severe surface tearing. Attach a metal comb to a mechanical device capable of grooving the entire pavement width in a single pass at a uniform speed. Operate grooving device to produce a uniform pattern of grooves parallel to pavement centerline. Evenly spaced grooves must have in the hardened pavement surface a uniform tine spacing of 0.75 inches between centers. Grooves must be 1/8 inch to 3/16 inch deep, and 1/10 inch to 1/8 inch wide. Provide hand combs with steel tines to use in event of mechanical comb breakdown.

Ramps, tapers, and miscellaneous (i.e. small and irregular areas) may be textured manually. The Engineer will determine at what point the pavement will not be allowed to be textured manually.

(10) Edging at Forms and Joints. After final finish, tool pavement edges to a radius of 1/4 inch, along both sides of each slab; and on both sides of transverse expansion joints, formed joints, and construction joints. Produce a smooth, dense mortar finish.

Eliminate tool marks on the slab, next to joints. Avoid disturbing rounding of slab corners. Remove concrete from joint filler top.

Before concrete sets, test joints with a straightedge and correct unevenness between joints and adjacent slabs.

(N) Surface Test. The request date for acceptance profile testing must not be less than 30 days following concrete placement. The request for an acceptance profile test must be made only when the Contractor has determined, using HDOT TM 6 California Type Profilograph, that the

pavement profile complies with the requirements of the Contract Documents. If the Engineer does not test the surface until after 30 days, the results must be considered valid. The finished pavement must comply with the following requirements when tested by the Engineer:

(1) Conduct surface test using a 12-foot straightedge at locations determined by the Engineer. When the straightedge is laid on the finished pavement in a direction parallel or normal to the centerline, the surface must not vary more than 1/4 inch from the lower edge.

(2) California Type Profilograph.

Provide a California Type Profilograph, labor, material, and other ancillary equipment to be used under the Engineer's supervision or for the Engineer's designated representative, e.g., third-party QA entity, consultant to do pavement profile testing, e.g., initial and any needed follow-up tests, when requested by the Engineer. The Contractor's means and methods of taking the pavement profile must be using a California-type profilograph in accordance with HDOT TM 6 Standard Practice for Operation of the California Type Profilograph and Evaluation of Profiles and these Contract Documents. The Contractor's equipment, e.g., profilograph must be certified as well as the personnel operating it. Certification must be by an entity accepted by the Engineer.

The Engineer will determine the profile of the pavement surface using a profilograph in accordance with HDOT TM 6 and these specifications. Take two profiles 3 feet from and parallel to each pavement edge and at the approximate location of each longitudinal joint for a total of four profiles. The Engineer may make changes to the location of the test path so that the test path is within the anticipated wheel path. Shoulders must be regarded as lanes. Shoulders over 12 feet wide must be regarded as multiple lanes. The Engineer will determine where the profile test paths will be located for the shoulders. Make an acceptance profile test request to the Engineer at least seven days before the desired testing date. When a request for acceptance profile testing is made, submit the total area to be tested, and indicate the limit of the testing on a copy of the Contract plans. Clean the pavement and clear obstructions from the area to be tested. The area 100 feet or more before and after the area to be tested must be clean and clear of obstructions. The Contractor must provide traffic control for profile testing. If in the sole opinion of the Engineer the pavement is not clean enough or obstacles are in the way or traffic control is not sufficiently safe the Engineer may cancel the acceptance profile test and count it as one acceptance profile test.

Any delay that occurs due to equipment not being available or certified or a lack of certified personnel will be regarded as a Contractor's delay.

The Engineer will perform an initial acceptance profile test set, at no cost to the Contractor.

If the pavement profile is found non-compliant the Contractor must do remedial repairs. Based on the Engineer's initial acceptance profile test set, the Contractor must perform remedial work before requesting a follow-up acceptance profile test. Re-profile test the area to ensure compliance with requirements before requesting another acceptance profile test. Perform additional remedial work and perform follow-up acceptance profile testing until an acceptable surface is obtained.

Additional testing, beyond the initial acceptance test, will be performed at a cost to the Contractor of $1,500 per test set per lane or $3,500 per day whichever is greater to pay for HDOT's personnel expenses for testing beyond the initial acceptance test plus any additional charges the Engineer deems are applicable. Payment may be made to the Material Testing and Research Branch or any State of Hawaii entity as directed by the Engineer or it may be deducted from any payment due to the Contractor.

During initial paving operations or after a long shutdown, when the concrete has cured sufficiently to allow profile testing, furnish, operate, and profile test the pavement to ensure that the means and methods being used will produce a pavement profile compliant with the requirements of the Contract Documents.

The Contractor and the Engineer will use the profile testing results to aid in evaluating paving methods and equipment. When the average profile index exceeds 15 inches per mile, suspend paving operations. Resumption of paving operations will not be allowed until corrective action is taken to the means and methods and accepted by the Engineer. Subsequent paving operations will be tested in accordance with the current profile testing procedures.

Use paving equipment and methods that produce riding surfaces having a profile index of 10 or less, except as provided herein.

Profile testing with a straight edge must be performed for the following pavement areas:

(a) Within superelevation transition on horizontal curves

having a centerline curve radius less than 1,000 feet.

(b) Within 15 feet of transverse joint that separates pavement from existing pavement not constructed under the Contract or from structural deck or approach slab.

These areas must be checked with a 12-foot straight edge.

For all areas reduce individual high points over 0.3 inches, as determined by profilogram measurements in accordance with HDOT TM 6, by diamond grinding until such high points shown by profilograph reruns do not exceed 0.3 inches. Diamond grinding refers to a process where closely spaced gang-mounted diamond saw blades are used to shave off a thin, top layer of a hardened concrete surface.

After completing the diamond grinding of high points, perform additional diamond grinding as necessary to a pavement profile in compliance with the requirements specified.

1. Perform additional diamond grinding as necessary so that lateral limits of grinding are at a constant offset from and parallel to the nearest lane line or pavement edge.

2. Perform additional diamond grinding, as necessary, to extend the area ground within any one surface area, in each longitudinal direction so that the diamond grinding begins and ends at lines normal to the pavement's centerline.

3. Ground areas must be neat, rectangular areas having a uniform surface appearance.

Do not diamond grind pavement to a smooth or polished finish unless otherwise indicated in the Contract Documents.

Diamond grinding must provide a line-type texture that contains parallel, longitudinal corrugations with ridge peaks approximately 1/16 inch higher than groove bottoms; and with 55 to 60 evenly spaced grooves per foot.

After diamond grinding is complete, mechanical texture, i.e., diamond grind grooves into the previously diamond ground surface. The grooves must align and match with the tine grooves or the diamond blade mechanically installed grooves of the unground surfaces. The grooves must produce a uniform pattern of grooves parallel to the pavement's centerline. Evenly spaced grooves must

have in the hardened concrete pavement surface a spacing of 0.75 inches between centers. Grooves must be 1/8 inch to 3/16 inch deep, and 1/10 inch to 1/8 inch wide. If the mechanical texturing is Next Generation Concrete Surface (NGCS) for the area surrounding the diamond ground surface follow the Next Generation Concrete Surface's pattern.

Pick up all grinding-operation residue using a vacuum attached to the grinding machine. Prevent residue from flowing across the pavement or from being left on the pavement surface or being tracked to the surrounding areas. Dispose of grinding residue at an Engineer and Department of Health accepted dump site.

The use of bush hammers, other impact devices, cold milling, and other methods that may, in the sole opinion of the Engineer, cause micro-cracking must not be used for pavement surface remediation.

Repair curing membrane damaged during surface remediation and testing operations if curing is still required.

The Contractor may dispute the results of the acceptance profile test and request a retest. In the request, the Contractor must state specifically why the test profile is in error and should be redone. If the retest results show a compliant profile there will be no charge for the retest and will be the sole remedy for this dispute. However, if the retest shows a non-compliant profile charges for additional profile tests will apply. The Contractor may also request a re-evaluation of the data, specifically indicating why the test profile evaluation by the Engineer is in error.

Complete corrective work before determining pavement thickness in accordance with Subsection 411.03(T) - Pavement Thickness.

(O) Curing. After finishing operations have been completed and as soon as marring of concrete will not occur, cure the entire newly placed concrete surface and edges in accordance with one of the methods described in this subsection. If forms are used, spray curing compound on the surface that was covered by the forms immediately after striping the form from the concrete. When curing requires the use of water, assign the highest priority for project water supply allocation to curing operations. Suspend concrete operations if there is insufficient cover material or water supply for curing and other project requirements. Do not leave concrete exposed for more than 30 minutes between stages of curing or during the curing period. Use atomized fog spray to place water into the air to increase the humidity as an interim cure or other methods accepted by the Engineer until the final curing medium

is in place. Cure concrete for at least 72 hours immediately after finishing the operation.

(1) Cotton or Burlap Mats. Cover surfaces to be cured with cotton or burlap mats having dimensions that when placed, extend at least 2 feet beyond the edges of the concrete strip placed. Overlap mats at least 6 inches. Place and maintain mats in complete contact with the surface being cured, throughout the curing period. Keep the cotton or burlap mats fully moist and in position for the entire length of the required curing period.

(2) Waterproof Paper. Thoroughly wet pavement surface and edges before placing paper. Cover surfaces to be cured with waterproof paper sized to extend when sheets are placed, at least 2 feet beyond edges of concrete strip; or sized to match pavement width and supplemented with 2-foot paper edge strips. Overlap sheets at least 18 inches. Place and maintain paper in complete contact with the surface being cured, throughout the curing period. When sheets are laid longitudinally, seal the paper so that it does not open up or separate during the curing period.

(3) White-Pigmented Curing Compound. Immediately after the finishing surface and before the concrete set has taken place, spray uniformly surfaces to be cured with a white-pigmented curing compound. There must be no holidays or streaking in the coat of the curing compound. Also, the white-pigmented curing compound must remain white and not allow the concrete's color to show through for the duration of the curing period. If it does show through reapply the white-pigmented curing compound/. When cotton or burlap mats are used to initially cure pavement, apply the white-pigmented curing compound upon removal of mats. Do not apply curing compound during and immediately after rainfall.

Use a fully atomized mechanical sprayer equipped with a tank agitator and wind guard to apply the two coats of curing compound, under pressure, at a rate of at least one gallon per 100 square feet per coat. Before spaying, the compound it must be in a thoroughly mixed uniform condition with pigment uniformly dispersed throughout the tank. Mechanically agitate the curing compound continuously during application. Hand-pump sprayers will be allowed only for spraying irregular widths and shapes and concrete surfaces exposed by form removal. Do not apply curing compound to the inside faces of joints to be sealed. However, if the curing period is not over, use other methods to continue the curing, e.g., wet burlap mats or lithium curing compound. Provide a means to verify the application rate of the curing compound being applied.

If curing film is damaged during the required curing period, immediately repair damaged portions with additional curing compound. Upon removal of side forms, immediately protect exposed slab edges with curing treatment equivalent to that provided for pavement surface.

(4) White Polyethylene Sheeting. Cover surfaces to be cured with polyethylene sheeting sized to extend when sheets are placed, at least 2 feet beyond the edges of the concrete strip. Overlap sheets at least 18 inches. Place and maintain sheeting in complete contact with the surface covered, throughout the curing period.

(5) If the construction joint requires that it bonds with the concrete poured against it a lithium curing compound will be acceptable as a curing compound. Lithium curing compound must not be used on the horizontal surface in place of other aforementioned curing methods unless specifically called for by the Contract Document, or a waiver is granted by the Engineer. A lithium sealer will not be accepted as a curing compound. The lithium curing compound must meet or exceed the requirements of ASTM C-309, and ASTM C-1315 and be a 28-day water cure equivalent. All work shall conform with the manufacturer's recommendations.

(P) Removing Forms. Keep forms in place for at least 12 hours. Protect pavement from damage during form removal. After removing forms, immediately cure exposed surfaces in accordance with Subsection 411.03(O) - Curing. Pavement areas containing major honeycombed areas will be rejected. Remove and replace rejected pavement areas that are full-lane-wide sections and at least 10 feet long; and in those areas where removal and replacement are necessary, remove remaining portions of the slab that are less than 10 feet long and adjacent to joints.

(Q) Sealing Joints. Clean and seal joints after completion of the curing period and before the pavement is opened to traffic. Clean each joint thoroughly of foreign matter, including debris, dirt, dust, concrete, saw cuttings, and curing material. Collect and dispose of all removed material.

Dry joint surfaces before sealing joint. Apply sealing material as indicated in the Contract Documents. If a hot sealer is used, stir the material during heating to prevent localized overheating. Pour sealing material without spilling on exposed concrete pavement surfaces. Immediately remove and clean excess material from the pavement surface. Use of sand or similar material as a cover for sealing material will not be allowed.

(R) Protection of Pavement. Protect pavement and its appurtenances from public and construction traffic. Protection must include using flaggers to direct traffic; and erecting and maintaining warning signs, lights, pavement

bridges, and crossovers.

Where indicated in the Contract Documents, construct pavement crossings for convenience of public traffic in accordance with Subsection 104.09 - Maintenance of Traffic.

Furnish and install materials for edge and surface protection of unhardened concrete. Edge protection materials include standard metal forms and wood planks having nominal thicknesses of not less than 2 inches and a nominal width of not less than pavement-edge thickness. Surface protection materials include burlap or cotton mats, curing paper, and plastic sheeting. Stop paving operations when rain appears imminent.

Repair or replace damaged pavement before final acceptance.

(S) Opening to Traffic. Allow traffic on the pavement when test specimens comply with Subsection 411.03(J) - Test Specimens have attained flexural strength of 550 pounds per square inch when tested in accordance with AASHTO T 97. Traffic will not be allowed on pavement sooner than seven days after concrete placement, regardless of strength attainment.

Clean, sign, mark pavement properly, and clear pavement of obstructions before opening the roadway to public traffic.

Construction traffic, equipment, and materials will not be allowed on the pavement during the curing period.

(T) Pavement Thickness. The Engineer will determine coring locations and observe the coring operation. The Engineer will check the thickness of the pavement by cores obtained by the Contractor in accordance with AASHTO T 24. The Engineer will measure cores in accordance with AASHTO T 148, except that measurement will be taken to the nearest one-thousandth of an inch; and the average of such measurements will be taken to the nearest one-hundredth of an inch. Take thickness core samples after completion of corrective work.

The Engineer will remove non-PCC pavement materials from the bottom of the core before determining pavement thickness.

Thickness core samples will be evaluated on basis of primary and secondary units. A primary pavement unit is defined as that area of mainline pavement placed in each day's paving operations, but not to exceed 1,300 square yards. Each ramp, including tapers, each intersection, and each crossover will be considered separate primary units. Drill one core for each primary unit.

A secondary pavement unit is defined as 1,000 linear feet, or fraction thereof, of each mainline traffic lane and each shoulder in each primary unit. Additionally, every 1,300 square yards of pavement in ramps, tapers, intersections, and crossroads will be considered secondary units, regardless of when concrete was placed. Drill one core for each secondary unit.

When the primary or secondary unit core is deficient by more than 0.2 inches but less than 0.6 inches, drill two additional cores within the same secondary unit. The length of the initial and two additional cores will be averaged.

When the primary of the secondary unit core is deficient by more than 0.6 inches, that core will not be used to determine the average thickness of the primary or secondary unit. Drill additional cores at intervals not exceeding 10 feet in each direction from the deficient core, measured parallel to the centerline, until one core is obtained in each direction, which is not deficient by more than 0.6 inches. Pavement thickness between these two additional cores will be evaluated separately from the balance of pavement in that lot.

Pavement limits for separate evaluation will be longitudinal weakened plane or construction joint on each side of the core and next transverse weakened plane, construction, or expansion joint, beyond each of the last two cores. Unless the Engineer allows pavement within evaluation limits to remain, remove and replace with a pavement of specified thickness, at no increase in the contract price or contract time. Drill one additional core in the remaining portion of the primary or secondary unit. That portion will be evaluated separately for payment in accordance with provisions specified in Subsection 411.05 - Payment.

After replacing deficient pavement, drill one core at random in the primary or secondary unit beyond the limits of replaced pavement and drill one core in the replaced pavement. The Engineer will evaluate for payment, pavement represented by core taken beyond limits of replaced pavement in accordance with provisions specified in Subsection 411.05 - Payment.

Before filling, apply epoxy grout conforming to Subsection 712.04(B) - Epoxy Grout to core holes. Fill core holes completely with concrete accepted by the Engineer.

(U) Certified Concrete Flatwork Finisher Requirement. Perform the placement and finishing operations of concrete flatwork with a minimum ratio of one certified ACI Concrete Flatwork Finisher and Technician with 4,500 hours of acceptable work experience (certified craftsman) per three concrete finishers (concrete finishers without ACI Concrete Flatwork Finisher and Technician certification and 4,500 hours of acceptable work experience) at each location on the project site having flatwork done. The concrete flatwork

must be under the direct supervision of a certified craftsman. Designate the certified craftsman who will be supervising and responsible for determining the quality of the finish of the concrete flatwork being performed. No flatwork must be performed without the required amount of certified craftsmen present.

(1) Flatwork concrete is defined as any concrete work that requires tools or machines to be used during the placement and finishing operations of concrete. Concrete flatwork includes concrete work that requires a specified finishing, smoothness, or rigid surface tolerances such as sidewalks, walkways, portland cement concrete pavement, concrete white-topping, girder seats, pier caps, bridge decks, on-grade concrete slabs, approach slabs, concrete overlays, and concrete repairs which exceed one square foot per day.

(2) Areas that are not considered flatwork concrete are the top of foundations or structures that will have backfill material placed directly on the concrete surface.

(3) Submit copies of the craftsman's current ACI certification 30 days before concrete flatwork begins for the Engineer's review and acceptance. The Engineer has the right to require the removal, replacement, retraining, and re-certification of a certified craftsman if that person does not, in the opinion of the Engineer, demonstrate the ability to place and finish concrete in accordance with the practices recommended in the ACI Concrete Flatwork Finisher Certification Program and to meet the finishing standards required by the Contract Documents.

(4) Any cost or impact to the contractor in providing, training, certification, retraining, replacement, or re-certification is incidental to the contract items that require concrete flatwork.

411.04 Measurement.

(A) Concrete pavement will be paid for per square yard.

(B) The Engineer will not measure longitudinal joints, transverse expansion joints, transverse contraction joints, or construction joints separately and will consider the cost for those items as included in the contract price for the concrete pavement.

411.05 Payment. The Engineer will pay for the accepted pay items listed below at the contract price per pay unit, as shown in the proposal schedule. Payment will be full compensation for the work prescribed in this section and the Contract Documents.

The Engineer will pay for each of the following pay items when included in the proposal schedule:

Pay Item	**Pay Unit**
_____ Concrete Pavement	Square Yard

The Engineer will pay for:

(A) 80 percent of the contract bid price upon completion of furnishing and placing formed joints or cutting grooves in the pavement.

(B) 20 percent of the contract bid price upon completion of cleaning up, including removal of saw-cutting residue.

When the primary or secondary unit core thickness is deficient by not more than 0.2 inches from the planned thickness, the Engineer will pay for that primary or secondary unit at 100 percent.

When the primary or average secondary unit core thickness indicates pavement thickness is deficient by more than 0.2 inches but not more than 0.6 inches, the Engineer will determine pay for that the primary or secondary unit an adjusted price that will be the final adjusted price after adjustments have been made for other deficiencies if any are applicable.

The Engineer will not pay for pavement allowed to remain with thickness deficiency greater than 0.6 inches.

When the Engineer determines that thickness-deficient areas warrant removal, remove and replace those areas with concrete having the thickness indicated in the Contract Documents. Replacement pavement will be in accordance with requirements of Subsection 411.03(T) - Pavement Thickness and this subsection.

When the profile index does not exceed 10, the Engineer will pay for the accepted pavement. When the profile index exceeds 10 the Contractor must diamond grind the surface to a profile index of 10 or less and then mechanically groove the ground pavement surface. It will not be acceptable to leave the diamond ground pavement surface without it being mechanically grooved.

The Engineer at its sole digression determines an adjusted price using the planned thickness of PCC pavement. The adjusted price will apply to the total area of the 0.1-mile section for lane width represented by the acceptance profile test.

END OF SECTION 411

SECTION 603 – CULVERTS AND STORM DRAINS

Make the following amendments to said Section:

(I) Amend **603.03(C)(1) - Culverts** by revising lines 106 to 108 to read as follows:

"Spacing between multi-barrel culverts shall be a minimum of 18 inches or 0.5 the culvert width, whichever is greater. The minimum spacing shall be 1 foot when placing controlled low strength material (CLSM) as backfill. Anchor the culverts in such a manner that the horizontal and vertical alignment of the culverts does not change."

(II) Amend **603.04 – Measurement** by revising lines 282 to 292 to read as follows:

"**603.04 Measurement.**

(A) The Engineer will measure bed course material for culverts per cubic yard in accordance with contract documents.

(B) The Engineer will measure cleaning of existing culverts on a force account basis in accordance with Subsection 109.06 - Force Account Provisions and Compensation and as ordered by the Engineer."

(III) Amend **603.05 – Payment** by revising lines 294 to 349 to read as follows:

"**603.05 Payment.** The Engineer will pay for the accepted pay items listed below at the contract price per pay unit, as shown in the proposal schedule. Payment will be full compensation for the work prescribed in this section and contract documents.

The Engineer will pay for each of the following pay items when included in the proposal schedule:

Pay Item	**Pay Unit**
Bed Course Material for Culvert	Cubic Yard
_____ - Inch Reinforced Concrete Pipe, Class _____	Linear Foot
Clean Existing Culverts	Force Account

END OF SECTION 603

SECTION 605 — UNDERDRAINS

Make the following amendments to said Section:

(I) Amend **605.04 - Measurement** lines 60 to 61 to read as follows:

"605.04 Measurement. The Engineer will measure underdrains per linear feet in accordance with the contract documents."

(II) Amend 605.05 - Payment lines 63 to 76 to read as follows:

"605.05 Payment. The Engineer will pay for the accepted pay item listed below at contract price per pay unit, as shown in the proposal schedule. Payment will be full compensation for the work prescribed in this section and the contract documents.

The Engineer will pay for the following pay item when included in the proposal schedule:

Pay Item	**Pay Unit**
_____ Inch Perforated Underdrain Pipe	Linear Foot

(1) 40% of the contract unit price upon completion of excavating to the required dimensions and grade.

(2) 20% of the contract unit price upon completion of installing geotextile fabric.

(3) 40% of the contract unit price upon completion of placing untreated permeable base and perforated pipe and wrapping geotextile fabric.

END OF SECTION 605

PROPOSAL SCHEDULE
(All Work Excluding New Sewer Facilities)

ITEM NO.	ITEM	APPROX. QUANTITY	UNIT	UNIT PRICE	AMOUNT
201.0100	Clearing and Grubbing	L.S.	L.S.	L.S.	$_____
202.0100	Removal of Existing Hot Mix Asphalt (HMA) Pavement	3,400	S.Y.	$_____	$_____
202.0200	Removal of Existing Pavement Markings	1,460	L.F.	$_____	$_____
202.0300	Removal of Existing Guardrail	3,450	L.F.	$_____	$_____
202.0400	Removal of Existing Signs, Sign Posts, and Foundations	13	Each	$_____	$_____
202.0500	Removal of Existing Cantilever Overhead Sign w/ 28’ Wide Guide Sign, Sign Post, and Foundations	1	Each	$_____	$_____
202.0600	Removal of Existing Emergency Call Box, Post and Foundation	1	Each	$_____	$_____
202.0700	Removal of Existing Trees	6	Each	$_____	$_____
202.0800	Removal of Existing Concrete, Rock, and Debris	L.S.	L.S.	L.S.	$_____
202.0900	Removal of Existing Drainage Structure, Drain Line, Salvage Frame and Manhole Cover	L.S.	L.S.	L.S.	$_____
202.1000	Removal of Existing Headwall	L.S.	L.S.	L.S.	$_____

PROPOSAL SCHEDULE
(All Work Excluding New Sewer Facilities)

ITEM NO.	ITEM	APPROX. QUANTITY	UNIT	UNIT PRICE	AMOUNT
203.0100	Roadway Excavation	4,870	C.Y.	$_____	$_____
203.0200	Borrow Excavated Material	51,400	C.Y.	$_____	$_____
204.0100	Trench Excavation for Water Line	700	C.Y.	$_____	$_____
204.0200	Trench Backfill for Water Line	1,000	C.Y.	$_____	$_____
205.0100	Structure Excavation for Concrete Retaining Wall	3,900	C.Y.	$_____	$_____
205.0200	Structure Backfill for Concrete Retaining Walls	25,000	C.Y.	$_____	$_____
205.0300	Nonwoven Geotextile Fabric	4,175	S.Y.	$_____	$_____
206.0100	Excavation for 12" Drain Line	4	C.Y.	$_____	$_____
206.0200	Excavation for 15" Drain Line	10	C.Y.	$_____	$_____
206.0300	Excavation for 18" Drain Line	8	C.Y.	$_____	$_____
206.0400	Excavation for 24" Drain Line	775	C.Y.	$_____	$_____
206.0500	Excavation for 48" Drain Line	1,050	C.Y.	$_____	$_____
206.0600	Excavation for 10’ x 4’ Concrete Box Culvert	1,330	C.Y.	$_____	$_____

PROPOSAL SCHEDULE
(All Work Excluding New Sewer Facilities)

ITEM NO.	ITEM	APPROX. QUANTITY	UNIT	UNIT PRICE	AMOUNT
209.0100	Installation, Maintenance, Monitoring and Removal of B.M.P.	L.S.	L.S.	L.S.	$_____
209.0200	Additional Water Pollution, Dust, and Erosion Control	F.A.	F.A.	F.A.	$ 65,000.00
301.0100	Hot Mix Asphalt Base Course	280	Ton	$_____	$_____
304.0100	Aggregate Base Course	905	C.Y.	$_____	$_____
304.0200	Imported Granular Fill	1,025	C.Y.	$_____	$_____
305.0100	Aggregate Subbase	11,700	C.Y.	$_____	$_____
315.0100	Nonwoven Geotextile Fabric	4,175	S.Y.	$_____	$_____
316.0100	Polypropylene Biaxial Geogrid	1,966	S.Y.	$_____	$_____
401.0100	Hot Mix Asphalt (HMA) Pavement, Mix No. IV	395	Ton	$_____	$_____
401.0200	Polymer Modified Asphalt (PMA) Pavement, Mix No. IV	50	Ton	$_____	$_____
411.0100	12-Inch Concrete Pavement	15,000	S.Y.	$_____	$_____
503.0100	Concrete Retaining Wall	6,300	C.Y.	$_____	$_____
503.0300	Concrete in Thrust Blocks for Water Line	18	C.Y.	$_____	$_____

PROPOSAL SCHEDULE
(All Work Excluding New Sewer Facilities)

ITEM NO.	ITEM	APPROX. QUANTITY	UNIT	UNIT PRICE	AMOUNT
503.0400	Concrete in Thrust Beams	11	C.Y.	$_____	$_____
503.0500	Concrete in Reinforced Concrete Jacket for Water Line	15	C.Y.	$_____	$_____
503.0600	Concrete in Headwall	13	C.Y.	$_____	$_____
503.0800	Concrete in 10’ x 4’ Concrete Box Culvert	675	C.Y.	$_____	$_____
503.0900	Concrete in End Posts	7	C.Y.	$_____	$_____
508.0100	Cement Rubble Masonry	365	C.Y.	$_____	$_____
603.0100	12-lnch Reinforced Concrete Pipe, Class III	36	L.F.	$_____	$_____
603.0200	15-lnch Reinforced Concrete Pipe, Class III	6	L.F.	$_____	$_____
603.0300	18-lnch Reinforced Concrete Pipe, Class III	5	L.F.	$_____	$_____
603.0400	24-lnch Reinforced Concrete Pipe, Class III	1,150	L.F.	$_____	$_____
603.0500	48-lnch Reinforced Concrete Pipe, Class III	625	L.F.	$_____	$_____
603.0600	Bed Course Material for Culvert	180	C.Y.	$_____	$_____
603.0700	Clean Existing Culverts	F.A.	F.A.	F.A.	$ 100,000.00
604.0100	Type "1A-9P" Inlet, 4 Feet to 4.99 Feet	1	Each	$_____	$_____

PROPOSAL SCHEDULE (All Work Excluding New Sewer Facilities)					
ITEM NO.	**ITEM**	**APPROX. QUANTITY**	**UNIT**	**UNIT PRICE**	**AMOUNT**
604.0200	Type "1A-9P" Inlet, 5 Feet to 5.99 Feet	2	Each	$_____	$_____
604.0300	Type "1A-9P" Inlet, 8 Feet to 8.99 Feet	1	Each	$_____	$_____
604.0400	Type "1A-9P" Inlet, 9 Feet to 9.99 Feet	1	Each	$_____	$_____
604.0500	Type "1A-9P" Inlet, 10 Feet to 10.99 Feet	2	Each	$_____	$_____
604.0600	Type "1A-9P" Inlet, 17 Feet to 17.99 Feet	1	Each	$_____	$_____
604.0700	Type "1A-9P" Inlet, 22 Feet to 22.99 Feet	1	Each	$_____	$_____
604.0800	Type Modified “61614P” I-2 Inlet, 9 Feet to 9.99 Feet	1	Each	$_____	$_____
604.0900	Type Modified “61614P” I-1 Inlet, 13 Feet to 13.99 Feet	1	Each	$_____	$_____
604.1000	Type “61614P” Inlet, 4 Feet to 4.99 Feet	1	Each	$_____	$_____
604.1100	Type Riser G-1 Structure, 2 Feet to 2.99 Feet	1	Each	$_____	$_____
604.1200	Type Riser H-1 Structure, 2 Feet to 2.99 Feet	1	Each	$_____	$_____
604.1300	Type SDMH I-1 Structure, 26 Feet to 26.99 Feet	1	Each	$_____	$_____
604.1400	Type SDMH I-2 Structure, 21 Feet to 21.99 Feet	1	Each	$_____	$_____

PROPOSAL SCHEDULE
(All Work Excluding New Sewer Facilities)

ITEM NO.	ITEM	APPROX. QUANTITY	UNIT	UNIT PRICE	AMOUNT
604.1500	Type Modified SDMH A-3 P, Cast Iron Frame and Cover, 0 Feet to 0.99 Feet	1	Each	$_____	$_____
604.1600	Type "A" Manhole, 4 Feet to 4.99 Feet	1	Each	$_____	$_____
604.1700	Type "C" Manhole, 8 Feet to 8.99 Feet	1	Each	$_____	$_____
604.1800	Type "C" Manhole, 21 Feet to 21.99 Feet	2	Each	$_____	$_____
604.1900	Type "C" Manhole, 24 Feet to 24.99 Feet	1	Each	$_____	$_____
604.2000	Type “B1” Catch Basin, 5 Feet to 5.99 Feet	1	Each	$_____	$_____
604.2100	Type “C1” Catch Basin, 5 Feet to 5.99 Feet	1	Each	$_____	$_____
604.2200	Type “C1” Catch Basin, 2 Feet to 2.99 Feet	1	Each	$_____	$_____
604.2300	Type “D” Manhole, 5 Feet to 5.99 Feet	1	Each	$_____	$_____
605.0200	6-Inch Perforated Underdrain Pipe	1,850	L.F.	$_____	$_____
606.0100	Guardrail Type 3 MGS W-Beam with Strong Posts	4,605	L.F.	$_____	$_____
606.0200	Guardrail Type 3 Thrie Beam with Strong Posts	70	L.F.	$_____	$_____
606.0300	Guardrail Type 3 Thrie Beam Median with Strong Posts	400	L.F.	$_____	$_____

PROPOSAL SCHEDULE
(All Work Excluding New Sewer Facilities)

ITEM NO.	ITEM	APPROX. QUANTITY	UNIT	UNIT PRICE	AMOUNT
606.0400	Guardrail Type MASH TL-3 Temporary Barrier	5,550	L.F.	$_____	$_____
606.0500	Reset Guardrail	25	L.F.	$_____	$_____
606.0600	Terminal Section Type MSKT or Equal	2	Each	$_____	$_____
606.0700	Terminal Section Type MFLEAT MASH or Equal	1	Each	$_____	$_____
606.0800	Terminal Section Type Thrie Beam Terminal Connector	1	Each	$_____	$_____
606.0900	Terminal Section Type Trailing End Anchorage	1	Each	$_____	$_____
606.1000	Terminal Section Type Thrie Beam End Section	1	Each	$_____	$_____
606.1100	Transition Section Type MGS to W-Beam	1	Each	$_____	$_____
606.1200	Transition Section Type W-Beam to Thrie Beam	5	Each	$_____	$_____
607.0100	6-Feet, Chain Link Fence With Metal Post	30	L.F.	$_____	$_____
619.0100	Coral Boulder and Fabric Liner	L.S.	L.S.	L.S.	$_____
622.0100	Highway Light Standards With Non-Breakaway Transformer Bases, On 31-ft-3-lnch Tall Poles, 15-ft Bracket Arms, 218 Watt LED Luminaires, 480 Volts and Concrete Foundation	38	Each	$_____	$_____

PROPOSAL SCHEDULE
(All Work Excluding New Sewer Facilities)

ITEM NO.	ITEM	APPROX. QUANTITY	UNIT	UNIT PRICE	AMOUNT
622.0200	Type C Highway Lighting Pullboxes	6	Each	$_____	$_____
622.0300	Four 2-Inch Highway Lighting Ducts, Concrete Encased	740	L.F.	$_____	$_____
622.0400	One 2-Inch Highway Lighting Duct, Concrete Encased	3,740	L.F.	$_____	$_____
622.0500	Connect Existing Highway Lighting Conduit To New Highway Lighting Conduit	5	Each	$_____	$_____
622.0600	Equipment Enclosure and Wiring Modifications in Existing Highway Lighting Equipment Enclosure	1	Each	$_____	$_____
622.0700	Stub and Cap Highway Lighting Ducts	2	Each	$_____	$_____
622.0800	Demolish and Remove Existing Highway Lighting Pullbox And Backfill, Complete	3	Each	$_____	$_____
622.0900	Remove Existing Highway Lighting Conduits And Wires, Complete and Backfill, Complete	210	Each	$_____	$_____
622.1000	Remove Existing Highway Light Standards, Bracket Arms, And Luminaires; Salvage, Clean And Deliver To The State; Demolish And Remove Concrete Bases And Backfill, Complete	9	Each	$_____	$_____

PROPOSAL SCHEDULE
(All Work Excluding New Sewer Facilities)

ITEM NO.	ITEM	APPROX. QUANTITY	UNIT	UNIT PRICE	AMOUNT
622.1100	Existing 2” Conduit With New 3 No. 1, 1 No. 2 Ground Highway Lighting Conductors	1,880	Each	$_____	$_____
622.1200	New 3 No. 1, 1 No. 2 Ground Highway Lighting Conductors	5,760	Each	$_____	$_____
622.1300	Disconnect and Remove Existing Direct Buried Highway Lighting Cables, and Backfill Complete	930	Each	$_____	$_____
622.1400	Disconnect and Remove Existing Highway Lighting Circuit Conductors, Fill Empty 2-inch Conduit With Concrete and Abandon In Place	200	L.F.	$_____	$_____
622.1500	Remove and Relocate Existing Highway Light Standard onto New Concrete Foundation, Including All Highway Lighting Wiring as Required, and Demolish and Remove Existing Concrete Base, and Backfill Complete	1	Each	$_____	$_____
622.1600	Existing Highway Light Pullbox to be Demolished and Removed and Replaced with New Traffic Rated Type C Highway Light Pullbox, Adjust to Final Grade	1	Each	$_____	$_____
622.1700	Connect existing highway lighting to JCI lightgrid system	L.S.	L.S	L.S.	$_____
623.0100	Type A Traffic Signal/Communications Pullboxes	7	Each	$_____	$_____

PROPOSAL SCHEDULE
(All Work Excluding New Sewer Facilities)

ITEM NO.	ITEM	APPROX. QUANTITY	UNIT	UNIT PRICE	AMOUNT
623.0200	Type C Traffic Signal/Communications Pullboxes	7	Each	$_____	$_____
623.0300	Two 2-Inch Traffic Signal Ducts, Concrete Encased	3,910	L.F.	$_____	$_____
623.0400	Stub and Cap Traffic Signal Ducts	10	Each	$_____	$_____
623.0500	Connect Existing Traffic Signal Conduit to New Traffic Signal Conduit	5	Each	$_____	$_____
623.0600	Traffic Rated Type A Traffic Signal/Communications Pullboxes	11	Each	$_____	$_____
623.0700	Traffic Rated Type C Traffic Signal/Communications Pullboxes	11	Each	$_____	$_____
623.0800	Two 2-Inch Communications Signal Ducts, Concrete Encased	4,020	L.F.	$_____	$_____
623.0900	One 2-Inch Communications Electric Ducts, Concrete Encased	460	L.F.	$_____	$_____
623.0950	One 3-Inch Communications Electric Ducts, Concrete Encased	3,560	L.F.	$_____	$_____

PROPOSAL SCHEDULE
(All Work Excluding New Sewer Facilities)

ITEM NO.	ITEM	APPROX. QUANTITY	UNIT	UNIT PRICE	AMOUNT
623.1000	Existing Traffic Signal Pullbox to be Demolished and Removed and Replaced with New Traffic Rated Type A Traffic Signal Pullbox, Adjusted to Final Grade	1	Each	$_____	$_____
623.1100	Existing Traffic Signal Pullbox to be Demolished and Removed and Replaced with New Traffic Rated Type B Traffic Signal Pullbox, Adjusted to Final Grade	1	Each	$_____	$_____
624.0100	Water Systems	L.S.	L.S.	L.S.	$_____
626.0100	6-Inch Standard Valve Box	2	Each	$_____	$_____
626.0200	16-Inch Beveled Gear Standard Valve Box	1	Each	$_____	$_____
626.0300	24-Inch Beveled Gear Standard Valve Box	1	Each	$_____	$_____
627.0100	Hydrodynamic Separator Structures	L.S.	L.S.	L.S.	$_____
629.0100	4-Inch Pavement Striping (Thermoplastic Extrusion)	2,920	L.F.	$_____	$_____
629.0200	6-Inch Pavement Striping (Thermoplastic Extrusion)	4,870	L.F.	$_____	$_____
629.0300	8-Inch Pavement Striping (Thermoplastic Extrusion)	1,740	L.F.	$_____	$_____
629.0400	12-Inch Pavement Striping (Thermoplastic Extrusion)	1,250	L.F.	$_____	$_____

PROPOSAL SCHEDULE (All Work Excluding New Sewer Facilities)					
ITEM NO.	**ITEM**	**APPROX. QUANTITY**	**UNIT**	**UNIT PRICE**	**AMOUNT**
629.0500	Crosswalk Marking (Thermoplastic Extrusion)	100	L.F.	$_____	$_____
629.0600	Pavement Symbol (Thermoplastic Extrusion)	9	Each	$_____	$_____
629.0700	Profiled Thermoplastic Striping	19	Each	$_____	$_____
629.0800	Type “C” Pavement Markers	250	Each	$_____	$_____
629.0900	Type “F” Pavement Markers	2	Each	$_____	$_____
629.1000	Type “H” Pavement Markers	76	Each	$_____	$_____
631.0100	Regulatory Sign (10 Square Feet or Less, w/ post)	6	Each	$_____	$_____
631.0200	Regulatory Sign (More than 10 Square Feet, w/ 2 posts)	1	Each	$_____	$_____
631.0300	Warning Sign (10 Square Feet or Less, w/ post)	10	Each	$_____	$_____
631.0400	Warning Sign (More than 10 Square Feet, w/ 2 posts)	3	Each	$_____	$_____
631.0500	Interchange Exit Sign (2 posts)	1	Each	$_____	$_____
631.0600	Relocation of Existing Sign	1	Each	$_____	$_____
631.0700	Guide Sign (Expressway)	4	Each	$_____	$_____

PROPOSAL SCHEDULE
(All Work Excluding New Sewer Facilities)

ITEM NO.	ITEM	APPROX. QUANTITY	UNIT	UNIT PRICE	AMOUNT
631.0800	Guide Sign (1 Post)	3	Each	$_____	$_____
634.0100	Portland Cement Concrete Sidewalk	439	C.Y.	$_____	$_____
636.0100	E-Construction License	F.A.	F.A.	F.A.	$ 10,000.00
638.0100	Curb, Type 2D	1,650	L.F.	$_____	$_____
638.0200	Curb and Gutter, Type 2DG	2,730	L.F.	$_____	$_____
641.0100	Hydro-mulch Seeding	L.S.	L.S.	L.S.	$_____
643.0100	Maintenance of Existing Landscape Areas	F.A.	F.A.	F.A.	$ 25,000.00
645.0100	Traffic Control	L.S.	L.S.	L.S.	$_____
645.0200	Additional Police Officers, Additional Traffic Control Devices, and Advertisement	F.A.	F.A.	F.A.	$ 750,000.00
648.0100	Field Posted Drawings	L.S.	L.S.	L.S.	$_____
650.0100	Curb Ramp, Type B	6	Each	Each	$_____
650.0200	Detectable Warning Mat	6	Each	Each	$_____
696.0100	Field Office Trailer (Not to exceed $32,000, 1 Total)	L.S.	L.S.	L.S.	$_____

PROPOSAL SCHEDULE
(All Work Excluding New Sewer Facilities)

ITEM NO.	ITEM	APPROX. QUANTITY	UNIT	UNIT PRICE	AMOUNT
696.0200	Maintenance of Trailers	F.A.	F.A.	F.A.	$ 50,000.00
699.0100	Mobilization (Not to exceed 6 percent of the sum of all items excluding the bid price of this item)	L.S.	L.S.	L.S.	$_____

a. Sum of All Items (All Work Excluding New Sewer Facilities) ..... $_____

NOTE: Bidders must complete all unit prices and amounts. Failure to do so may be grounds for rejection of bid.

PROPOSAL SCHEDULE FOR NEW SEWER FACILITIES
(HARBOR ACCESS ROAD BL STA. 14+03.99 RT. to 19+22.76 RT.)

ITEM NO.	ITEM	APPROX. QUANTITY	UNIT	UNIT PRICE	AMOUNT
204.0300	Trench Excavation for 30" Sewer Line	2,150	C.Y.	$_____	$_____
204.0400	Trench Backfill for 30" Sewer Line	2,050	C.Y.	$_____	$_____
209.0300	Installation, Maintenance, Monitoring and Removal of B.M.P.	L.S.	L.S.	L.S.	$_____
209.0400	Additional Water Pollution, Dust, and Erosion Control	F.A.	F.A.	F.A.	$ 10,000.00
503.0700	Concrete in Reinforced Jacket for Sewer Line	70	C.Y.	$_____	$_____
625.0100	Sewer System	560	L.F.	$_____	$_____
626.0400	Sewer Type "SB" Manhole, 14 Feet to 14.99 Feet	1	Each	$_____	$_____
626.0500	Sewer Type "SB" Manhole, 15 Feet to 15.99 Feet	1	Each	$_____	$_____
699.0200	Mobilization (Not to exceed 6 percent of the sum of all items under excluding the bid price of this Item)	L.S.	L.S.	L.S.	$_____

PROPOSAL SCHEDULE FOR NEW SEWER FACILITIES
(HARBOR ACCESS ROAD BL STA. 14+03.99 RT. to 19+22.76 RT.)

ITEM NO.	ITEM	APPROX. QUANTITY	UNIT	UNIT PRICE	AMOUNT

b. Sum of All Items for New Sewer Facilities ..... $_____

NOTES:

1. See Sewer Plan and Profile (Plan Sheets no. U-1 and U-4) for new sewer facilities work.
2. Bidders must complete all unit prices and amounts. Failure to do so may be grounds for rejection of bid.

PROPOSAL SCHEDULE SUMMARY

a. Sum of All Items (All Work Excluding New Sewer Facilities) ..... $ _____

b. Sum of All Items for New Sewer Facilities ..... $ _____

c. Amount for Comparison of Bids (a+b) ..... $ _____

NOTE: Bidders must complete all unit prices and amounts. Failure to do so may be grounds for rejection of bid.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 8	167

GRADING NOTES

1. All grading work shall be done in accordance with Chapter 14, Articles 13, 14, 15 and 16, as related to Grading, Soil Erosion and Sediment Control of the Revised Ordinances of Honolulu, 1990, as amended, and soils report entitled, "Geotechnical Engineering Exploration and Pavement Justification Report, Kapolei Interchange Complex, Phase 3," by Geolabs, Inc., dated August 17, 2015 (Geotech Report) included with the bid documents.

2. As recommended in the Geotech Report, Contractor shall install settlement gauges as described in Section 3.2 Paragraph 4. Resumption of construction nearby the settlement gauges will be determined by the Engineer. The Contractor is responsible for the surveying of the settlement gauges and providing the information to HDOT. The Locations of the settlement gauges will be determined by the Engineer. Only the surface concrete sidewalk, curbs, and gutters, and the asphalt pavement construction shall be postponed until after the settlement gauges show no further settlement. Settlement is anticipated to occur during and after
⚠ construction of the high fill embankment. Estimated time to achieve 90% consolidation is about 2 months. Contractor shall anticipate a maximum of 4 months. Cost for settlement gauges and surcharge material shall be incidental to earthwork.

⚠
3. Cost for overexcavation for substantial shrinkage cracks shall be incidental to bid item 203.0100 Roadway Excavation.

4. No Contractor shall perform any grading operation so as to cause falling rocks, soil or debris in any form to fall, slide or flow onto adjoining properties, streets or natural watercourses. Should such violations occur, the Contractor may be cited and the Contractor shall immediately make all remedial actions necessary.

5. The Contractor, at his own expense, shall keep the project area and surrounding area free from dust nuisance. The work shall be in conformance with the air pollution control standards contained in the Hawaii Administrative Rules, Title 11, Chapter 60.1, "Air Pollution Control".

6. The underground pipes, cables or ductlines known to exist by the engineer from his search of records are indicated on the plans. The Contractor shall verify the locations and depths of the facilities and exercise proper care in excavating in the area. Wherever connections of new utilities are shown on the plans, the contractor shall expose the existing lines at the proposed connections to verify their locations and depths prior to excavation for the new lines.

7. Adequate provisions shall be made to prevent surface waters from damaging the cut face of an excavation or the sloped surfaces of a fill. Furthermore, adequate provisions shall be made to prevent sediment-laden runoff from leaving the site.

8. All slopes and exposed areas shall be sodded or planted as soon as final grades have been established. Planting shall not be delayed until all grading work has been completed. Grading to final grade shall be continuous, and any area within which work has been interrupted or delayed shall be planted.

9. Fills on slopes steeper than 5:1 shall be keyed.

10. No grading work shall be done on Saturdays, Sundays and holidays at any time without prior notice to the District Manager, provided such grading work is also in conformance with the community noise control standards contained in the Hawaii Administrative Rules, Title 11, Chapter 46, "Community Noise Control".

11. The limits of the area to be graded shall be flagged before the commencement of the grading work.

12. All grading operations shall be performed in conformance with the applicable provisions of the water quality and water pollution control standards contained in Hawaii Administrative Rules, Title 11, Chapter 54, "Water Quality Standards", and Title 11, Chapter 55, "Water Pollution Control", and if applicable, the NPDES permit for the project.

13. Where applicable and feasible the measures to control erosion and other pollutants shall be in place before any earth moving phase of the grading is initiated.

14. Temporary erosion controls shall not be removed before permanent erosion controls are in-place, project acceptance and/or Engineer's approval.

15. Temporary erosion control procedures shall be submitted for approval to the Engineer prior to commencement of grading work on site.

16. If the grading work involves contaminated soil, then all grading work shall be done in conformance with applicable State and Federal requirements.

17. Pursuant to Chapter 6e, HRS, in the event any artifacts or human remains are uncovered during construction operations, the Contractor shall immediately suspend work and notify the Honolulu Police Department, the State Department of Land and Natural Resources-Historic Preservation Division (692-8015). In addition, the Contractor shall inform the Civil Engineering Branch, D.P.P. (768-8084).

18. For all projects, which will disturb one (1) acre or more of land, the Contractor shall not start construction until a Notice of General Permit Coverage (NGPC) is received from the Department of Health, State of Hawaii, and has satisfied any other applicable requirements of the NPDES permit program. The Contractor shall provide a written copy of the NGPC to the appropriate department or governmental agency per their requirements.

19. All grading and construction work shall implement measures to ensure that the discharge of pollutants from the construction site will be reduced to the maximum extent practicable and will not cause or contribute to an exceedance of water quality standards.

20. Non-compliance to any of the above requirements shall mean immediate suspension of all work, and remedial work shall commence immediately. All costs incurred shall be billed to the violator. Furthermore, violators shall be subjected to administrative, civil and/or criminal penalties.

PUBLIC HEALTH SAFETY & CONVENIENCE AND DUST NOTES

1. The Contractor shall observe and comply with all Federal, State and Local laws required for the protection of public health, safety and environmental quality.

2. The Contractor, at his own expense, shall keep the project and its surrounding areas free from dust nuisance. The work shall be in conformance with the Air Pollution Standards and Regulations of the State Department of Health.

3. The Contractor shall provide, install and maintain all necessary signs, lights, flares, barricades, markers, cones, and other protective facilities and shall take all necessary precautions for the protection, convenience and safety of the public.

4. The Contractor's attention is directed to Title 11, Department of Health, Chapter 46, "Community Noise Control," in which maximum allowable noise levels have been set. If the construction will be required to obtain a permit from the Director of the Department of Health, the Contractor shall obtain a copy of Chapter 46 and become familiar with the noise level restrictions and the procedures for obtaining a permit for construction activities. Application and information on variances from the Environmental Health Services Division, 591 Ala Moana Blvd., Rm. 125, Honolulu, Hawaii or by telephone 586-4576.

5. Where pedestrian walkways exist, they shall be maintained in passable condition or other facilities for pedestrians shall be provided. Temporary passage ways shall be accessible per ADAAG 206.1 & 402.1.

6. The graded area or project site that is cleared of vegetation shall be kept damp seven (7) days a week through the use of misters and/or water wagons as necessary. At the end of each day, the site shall be sufficiently dampened so that it will remain moistened during the night. If the use of water causes problems with mud or soil erosion or water pollution or if there is a Notice by the Board of Water Supply, to conserve water in the area, the Contractor shall utilize dust control agents accepted by the Engineer.

7. The Contractor shall conduct operations so that excavation, embankment, and imported materials are dampened to prevent dust problems.

8. The Contractor shall designate a contact person to whom the State can direct public inquires and/or complaints regarding fugitive dust. The person shall have the authority to resolve all inquires and complaints in regards to fugitive dust.

9. The Contractor shall hire an independent monitoring laboratory to monitor the amount of dust in the air daily or as directed by the Engineer. The monitoring shall begin before the project starts and end 90 days after the final acceptance. Adjustments to the Contractor's dust control means and methods shall be based on the Report made by the independent monitoring laboratory. A copy of all Reports shall be submitted to the Engineer. This monitoring work shall be incidental to the Section 209.0100 - Temporary Water Pollution, Dust, and Erosion Control. Cost of the dust monitoring shall be incidental to 209.0100 - Temporary Water Pollution, Dust, and Erosion Control.

GENERAL PORTLAND CEMENT CONCRETE (PCC) PAVEMENT AND JOINTING NOTES:

1. All new PCC pavements shall be provided with permeable base course and longitudinal drains as shown on the civil drawings.

2. Details and information for pavement width, pavement thickness, pavement boundaries, pavement layout (plans and profiles), cross slope, roadway sections, and pavement sections are shown in the civil drawings.

3. For further information regarding the placement of concrete and load transfer devices (e.g. tiebars and dowels), refer to Section 411 - Portland Cement Concrete Pavement, Section 601 - Structural Concrete, and Section 602 - Reinforcing Steel.

4. For other joint requirements, see Section 411 - Portland Concrete Pavement.

5. Provide shop drawings for all joint layouts. Include reinforcing where obstructions such as manholes are encountered, gore areas, termination of concrete with triangular or odd shaped slabs, and at intersections with other streets.

⚠6. Locate longitudinal joints along lane lines as much as practical.

7. Pavement widths in excess of 12 feet shall be provided with Longitudinal Joints. These joints shall be located within the lane lines unless shown elsewhere on the plans.

8. The joint between outside lane and shoulder shall be a longitudinal
⚠ warping joint unless otherwise shown on the plans.

9. The spacing between Transverse Joints shall not exceed 12 feet
⚠ minimum to 15 feet maximum unless otherwise shown in the plans.

10. Where a monolithic curb is specified, the transverse joint in the curb shall coincide with pavement joints and may be formed by any
⚠ means approved by the engineer.

11. Use isolations joints to isolate the new PCC pavement from a structure, another paved area, or an immovable object. Isolation joints shall be provided at intersections, abutments, and around in-pavement structures such as drainage inlets, manholes and lighting structures.

12. Reinforce odd shape slabs with mismatch joints. Odd shape slabs are slabs with lenth-to-width ratios greater than 1.25, triangular, and other non-square shaped slabs.

13. Triangular shapes are not allowed unless otherwise shown on the plans. Trim bars are required for triangular shapes with corner angles < 70°, and for pavement sections opposite mismatched joint.

14. The Contractor shall not damage the epoxy coating on the dowels and deformed bars in any way during shipment, handling, or placement. Damaged epoxy coated dowels and deformed bars shall be replaced at no cost to the State.

15. Where new PCC meets existing freeway longitudinally, use detail 6/T-13.

16. All concrete must comply with the concrete CO_2 footprint reduction requirements of Section 601.

17. Follow DOT Std. Plan D-23 for jointing around structures.

⚠18. Follow DOT Std. Plan D-18, D-19, and D-20 for Joint layout & details.

⚠	10/21/2022	Revised Grading Note 2-3 and PCC and Jointing Notes
	DATE	REVISION

ORIGINAL PLAN
NOTE BOOK
No.
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

CHRISTOPHER H. BALL
LICENSED PROFESSIONAL ENGINEER
No. 12144-C
HAWAII, U.S.A.

This work was prepared by me or under my supervision

Chris Ball 4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GRADING NOTES

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

Scale: As Noted Date: August 2022

SHEET No. **T-8** OF **167** SHEETS

ADD. 8

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-HI-1(271)	2022	ADD. 9	167

WATER POLLUTION AND EROSION CONTROL NOTES

A. GENERAL:

1. See Special Provisions Section 209 - Water Pollution and Erosion Control. Section 209 describes but is not limited to: submittal requirements; scheduling of a water pollution and erosion control conference with the Engineer; construction requirements; method of measurement; and basis of payment. In addition, Appendix A lists potential pollutant sources and corresponding BMPs used to mitigate the pollutants.

2. Follow the guidelines in the current HDOT Construction Best Management Practices Field Manual in developing, installing and maintaining the Best Management Practices (BMP) for the project. For any conflicting requirements between the Manual and applicable bid documents, the applicable bid documents will govern. Should a requirement not be clearly described within the applicable bid documents, the Contractor shall notify the Engineer immediately for interpretation. For the purposes of clarification under Note A.2, "applicable bid documents" include the construction plans, standard specifications, Special Provisions, Permits, and the Storm Water Pollution Prevention Plan (SWPPP) when applicable.

3. Follow the guidelines in the Honolulu's City & County "Rules Relating to Soil Erosion Standards and Guidelines" along with applicable Soil Erosion Guidelines for projects on Maui, Molokai, Kauai, and Hawaii.

4. The Engineer may assess liquidated damages of up to $27,500 for non-compliance of each BMP requirement and each requirement stated in Section 209 and special provisions, for every day of non-compliance. There is no maximum limit on the amount assessed per day.

5. The Engineer will deduct the cost from the progress payment for all citations received by the Department for non-compliance, or the Contractor shall reimburse the State for the full amount of the outstanding cost incurred by the State.

6. If necessary, install a rain gage prior to any field work including the installation of any site-specific best management practices. The rain gage shall have a tolerance of at least 0.05 inches of rainfall. Install the rain gage on the project site in an area that will not deter rainfall from entering the gage opening. Do not install in a location where rain water may splash into rain gage. The rain gage installation shall be stable and plumbed. Do not begin field work until the rain gage is installed and site-specific best management practices are in-place.

7. Submit Site-Specific BMP Plan to the Engineer along with a completed Site-Specific BMP Review Checklist within 21 calendar days of date of award. The Site-Specific BMP Review Checklist may be obtained from http://www.stormwaterhawaii.com.

B. WASTE DISPOSAL:

1. Waste Materials
Collect and store all waste materials in a securely lidded metal dumpster or roll off container with cover to keep rain out or loss of waste during windy conditions. The dumpster shall meet all local and State solid waste management regulations. Deposit all trash and construction debris from the site in the dumpster. Empty the dumpster weekly or when the container is two-thirds full, whichever is sooner. Do not bury construction waste materials onsite. The Contractor's supervisory personnel shall be instructed regarding the correct procedure for waste disposal. Post notices stating these practices in the office trailer, on a weatherproof bulletin board, or other accessible location acceptable to the Engineer. The Contractor shall be responsible for seeing that these procedures are followed. Submit the Solid Waste Disclosure Form for Construction Sites to the Engineer within 21 calendar days of date of award. Provide a copy of all the disposal receipts from the facility permitted by the Department of Health to receive solid waste to the Engineer monthly. This should also include documentation from any intermediary facility where solid waste is handled or processed.

2. Hazardous Waste
Dispose all hazardous waste materials in the manner specified by local or State regulations and by the manufacturer. The Contractor's site personnel shall be instructed in these practices and shall be responsible for seeing that these practices are followed

3. Sanitary Waste
Collect all sanitary waste from the portable units a minimum of once per week, or as required. Position sanitary facilities where they are secure and will not be tipped over or knocked down.

C. EROSION AND SEDIMENT CONTROL INSPECTION AND MAINTENANCE PRACTICES:

1. For projects with an NPDES Permit for Construction Activities, inspect at the following intervals. For construction areas discharging to nutrient or sediment impaired waters, inspect all control measures at least once each week and within 24 hours of any rainfall event of 0.25 inches or greater within a 24 hour period. For construction areas discharging to waters not impaired for nutrient or sediments, inspect all control measures weekly. Inspections are only required during the project's normal working hours. The discharge point water classification may be found in the SWPPP.

2. For projects without an NPDES Permit for Construction Activities, inspect all control measures weekly.

3. Maintain all erosion and sediment control measures in good working order. If repair is necessary, initiate repair immediately and complete by the close of the next work day if the problem does not require significant repair or replacement, or if the problem can be corrected through routine maintenance. When installation of a new erosion or sediment control or a significant repair is needed, install the new or modified control or complete the repair no later than 7 calendar days from the time of discovery. "Immediately" means the Contractor shall take all reasonable measures to minimize or prevent discharge of pollutants until a permanent solution is installed and made operational. If a problem is identified at a time in the day in which it is too late to initiate repair, initiation of repair shall begin on the following work day.

4. Remove built-up sediment from silt fence when it has reached one-third the height of the fence. Remove sediment from other perimeter sediment control devices when it has reached one-half the height of the device.

5. Inspect silt screen or fence for depth of sediment, tears, to verify that the fabric is securely attached to the fence posts or concrete slab and to verify that the fence posts are firmly in the ground. Inspect and verify the bottom of the silt screen is buried a minimum of 6 inches below the existing ground.

6. Inspect temporary and permanent seeding and planting for bare spots, washouts and healthy growth.

7. Complete and submit to the Engineer a maintenance inspection report within 24 hours after each inspection.

8. Provide a stabilized construction entrance at all points of exit onto paved roads to reduce vehicle tracking of sediments. Include stabilized construction entrance in the Water Pollution, Dust, and Erosion Control submittals. Minimum length should be 50 feet. Minimum width should be 30 feet. Minimum depth should be 12 inches or as recommended by the soils engineer and underlain with geo-textile fabric. If minimum dimensions cannot be met, provide other stabilization techniques that remove sediment prior to exit. Clean the paved street adjacent to the site entrance daily or as required to remove any excess mud, cold-planed materials, dirt or rock tracked from the site. Do not hose down the street without containing or vacuuming wash water. Cover dump trucks hauling material from the construction site with a tarpaulin. Remove sediment tracked onto the street, sidewalk, or other paved area by the end of the day in which the track-out occurs.

9. Include designated Concrete Washout Area(s) in the Water Pollution, Dust, and Erosion Control submittals.

10. Submit the name of a specific individual designated responsible for inspections, maintenance and repair activities and filling out the inspection and maintenance report.

11. Personnel selected for the inspection and maintenance responsibilities shall receive training from the Contractor. They shall be trained in all the inspection and maintenance practices necessary for keeping the erosion and sediment controls used onsite in good working order.

12. Contain, remove, and dispose slurry generated from saw cutting of pavement in accordance with approved BMP practices. Do not allow discharge into the drainage system or State waters.

13. For projects with an NPDES Permit for Construction Activities, immediately initiate stabilizing exposed soil areas upon completion of earth-disturbing activities for areas where earth-disturbing activities have permanently or temporarily ceased.
Earth-disturbing activities have permanently ceased

when clearing and excavation within any area of the construction site that will not include permanent structures has been completed. Earth-disturbing activities have temporarily ceased when clearing, grading, and excavation within any area of the site that will not include permanent structures will not resume (i.e., the land will be idle) for a period of 14 or more calendar days, but such activities will resume in the future. For construction areas discharging into waters not impaired for nutrients sediments, complete initial stabilization within 14 calendar days after the temporary or permanent cessation of earth-disturbing activities. For construction areas discharging into nutrient or sediment impaired waters, complete initial stabilization within 7 calendar days after the temporary or permanent cessation of earth-disturbing activities. Classification of water at the discharge point may be found in the SWPPP.

14. For projects without an NPDES Permit for Construction Activities, complete initial stabilization within 14 calendar days after the temporary or permanent cessation of earth-disturbing activities.

15. Construction Contractor shall be required to inspect and maintain the Permanent BMPs (two CDS Units, two Detention Basins, and three drain inlet filters) for a minimum of one year at the completion of the project, during the contractor maintenance period. Maintenance of the Permanent BMPs may require single lane closures of Farrington Highway and full closure and detour of Ramp SB for safety. Any lane closures and traffic controls required for maintenance of the Permanent BMPs require approval from HDOT.

16. Inspections shall be performed every 6 months and within 72 hours after a rainfall event of 1" or more on the hydrodynamic separators and drain inlet filters. When required, the hydrodynamic separators and drain inlets filters shall be cleaned and silt removed.

17. All detention basins shall be cleaned annually or when silt reaches 6" within the basin. Any accumulated silt and debris shall be removed. When silt reaches a height of 6" within the basin, it shall be removed and the riser shall be cleaned. The detention basin and riser shall also be inspected within 24 hours after a rainfall event of 1" or more.

18. Construction Contractor shall provide inspection and maintenance records to HWY-OW on a monthly basis during the contractor maintenance period.

19. Construction Contractor shall be responsible for providing, or identifying, the rain gauge to be used for monitoring rainfall for Permanent BMP inspection requirements.

20. Construction Contractor shall install permanent stage measurement gauges/plates in the detention basins and risers to measure sediment buildup during inspection and maintenance. Once construction has completed and the contractor maintenance period has finished the contractor shall turn over the state measurement gauges/ plates for use by HDOT.

21. Construction Contractor shall clean and repair (if necessary) the existing 36" 3-30", and 2-30" diameter pipes located upstream of the new drainage structures.

22. Construction Contractor shall be required to perform cleaning and maintenance of the Permanent BMPs, the new box culvert and any other drainage structures prior to turning over to HDOT. The Contractor shall also provide training to HDOT personnel involved in the maintenance and cleaning of the Permanent BMPs.

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE
NOTE BOOK | No.

DATE	REVISION
10/21/2022	Added ESCP notes #15-22

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WATER POLLUTION AND EROSION CONTROL 1

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-HI-1(271)

Scale: As Noted Date: August 2022

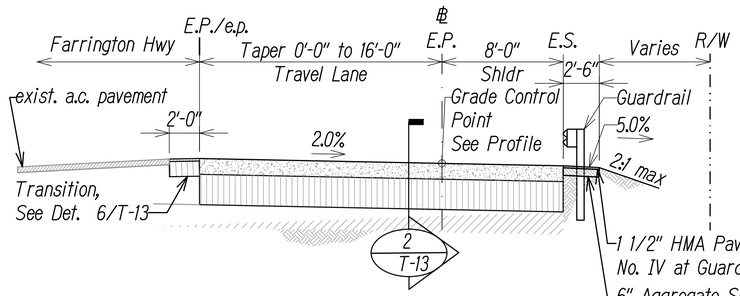
CHRISTOPHER H. BALL
LICENSED PROFESSIONAL ENGINEER
No. 12144-C
HAWAII, U.S.A.

This work was prepared by me or under my supervision

4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 23	167



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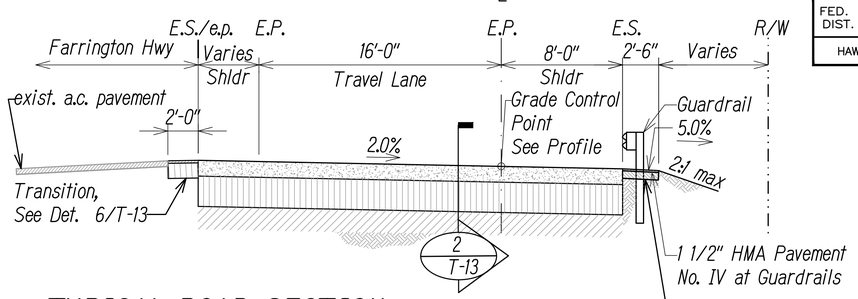
1 / RS-5

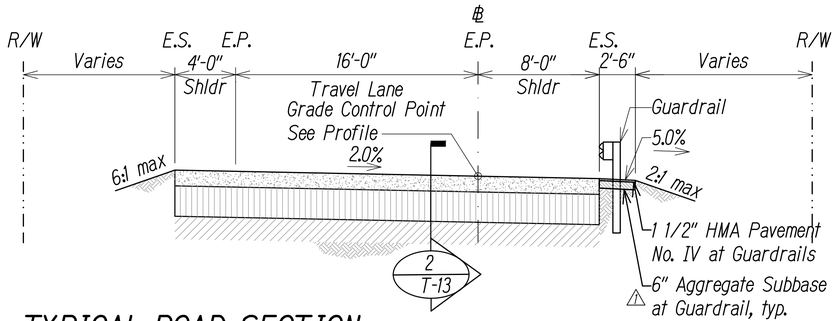
Scale: 1"=5'-0"



TYPICAL ROAD SECTION
℄ STA. 3+00.65 TO STA. 4+51.51 - RAMP SA

2 / RS-5

Scale: 1"=5'-0"



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3 / RS-5

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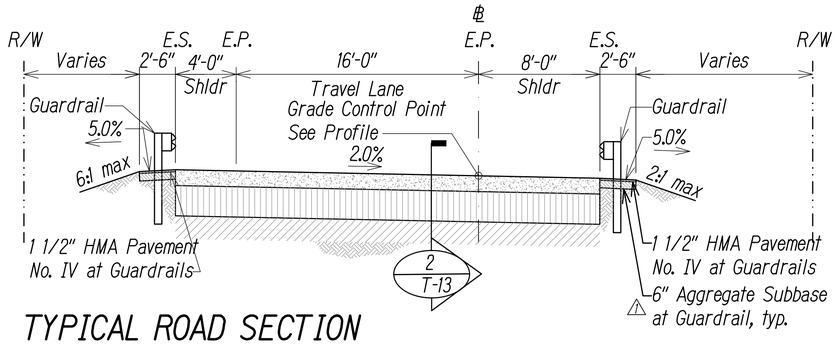
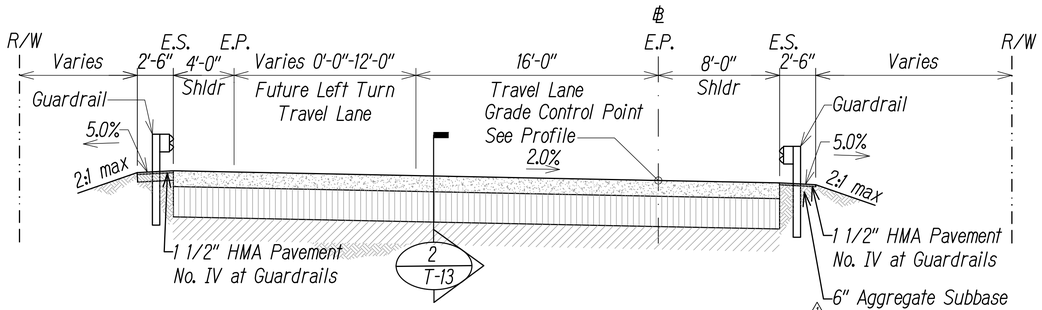


TYPICAL ROAD SECTION
℄ STA. 8+20.79 TO STA. 9+09.79 - RAMP SA

4 / RS-5

Scale: 1"=5'-0"



TYPICAL ROAD SECTION
℄ STA. 9+09.79 TO STA. 12+68.75 - RAMP SA

5 / RS-5

Scale: 1"=5'-0"

SURVEY PLOTTED BY
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TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

ORIGINAL PLAN
NOTE BOOK
No.

Graphic Scale

1" = 5' 5' 0 5' 10'

	DATE	REVISION
⚠	10/21/2022	Added 6" Aggregate Subbase at guardrails

CHRISTOPHER H. BALL
LICENSED PROFESSIONAL ENGINEER
No. 12144-C
HAWAII, U.S.A.

This work was prepared by me or under my supervision

Chris Ball 4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

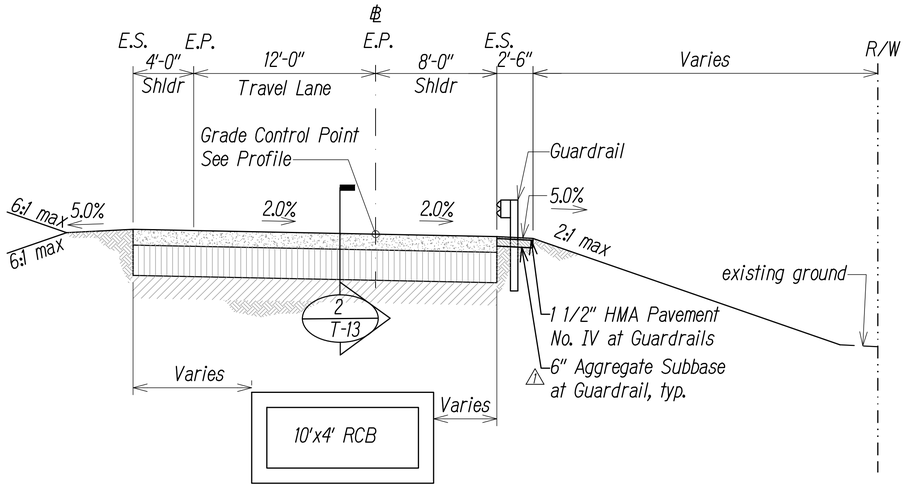
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL SECTIONS 5

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

Scale: As Noted Date: August 2022

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 24	167



TYPICAL ROAD SECTION
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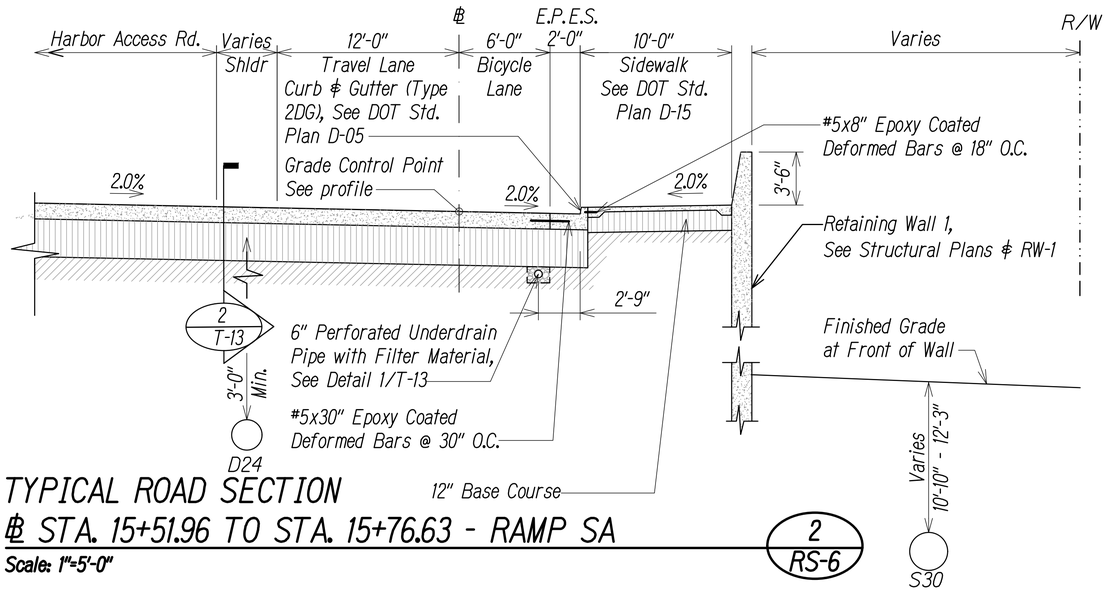
Scale: 1"=5'-0"

1 / RS-6



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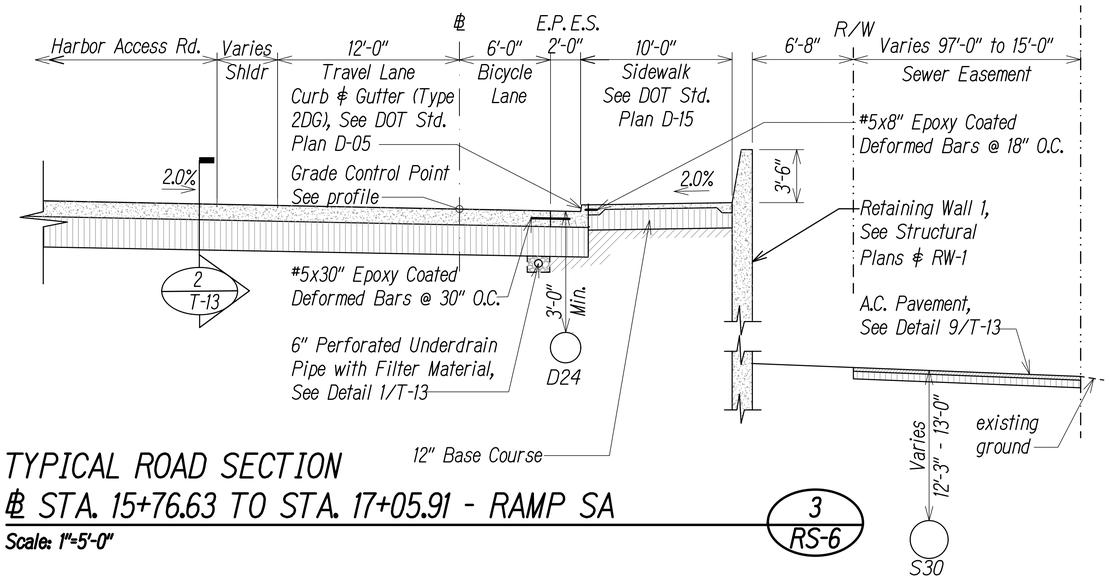
Scale: 1"=5'-0"

2 / RS-6



TYPICAL ROAD SECTION
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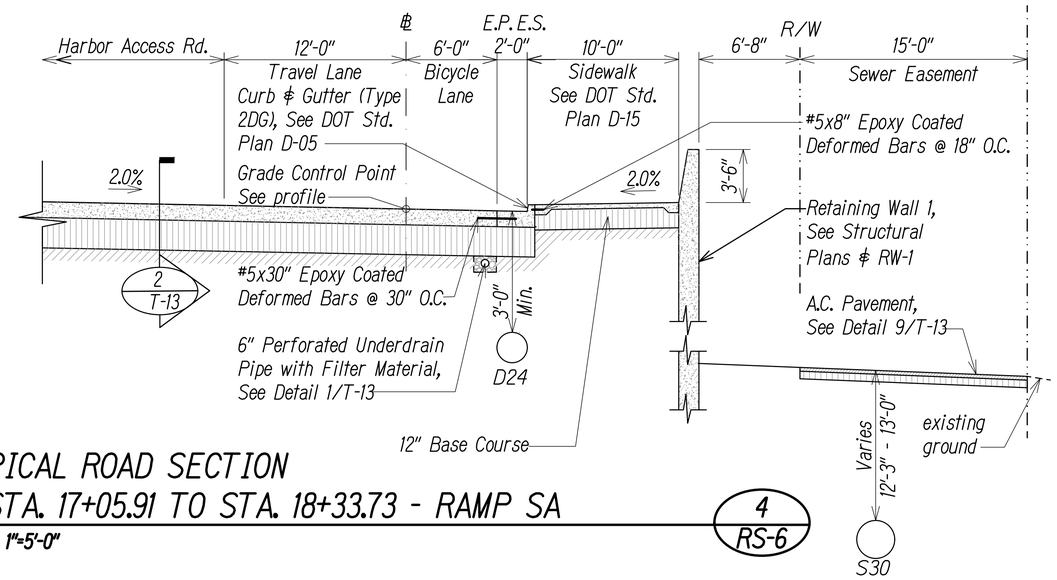
3 / RS-6



TYPICAL ROAD SECTION
℄ STA. 17+05.91 TO STA. 18+33.73 - RAMP SA

Scale: 1"=5'-0"

4 / RS-6

ORIGINAL PLAN
NOTE BOOK
No.

SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

Graphic Scale
1" = 5' 5' 0 5' 10'

DATE	REVISION
10/21/2022	Added 6" Aggregate Subbase at guardrails

CHRISTOPHER H. BALL
LICENSED PROFESSIONAL ENGINEER
No. 12144-C
HAWAII, U.S.A.

This work was prepared by me or under my supervision

Chris Ball 4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL SECTIONS 6

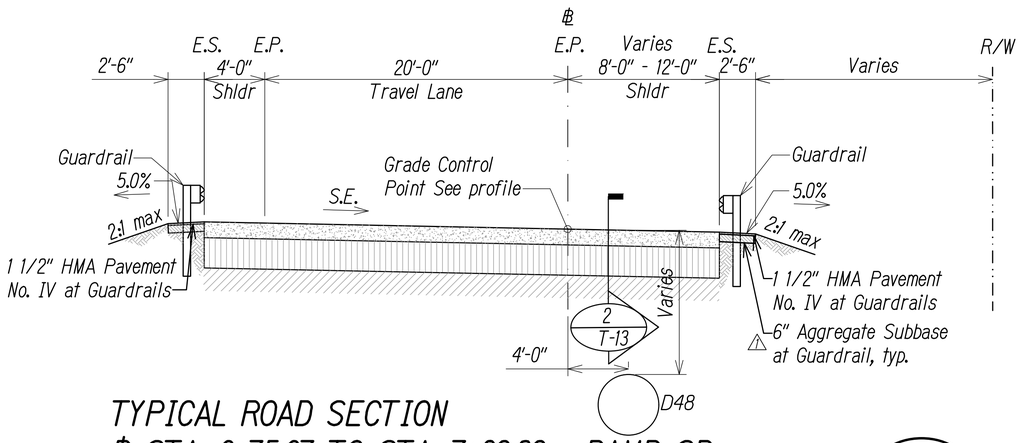
INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

Scale: As Noted Date: August 2022

SHEET No. **RS-6** OF **167** SHEETS

ADD. 24

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 26	167



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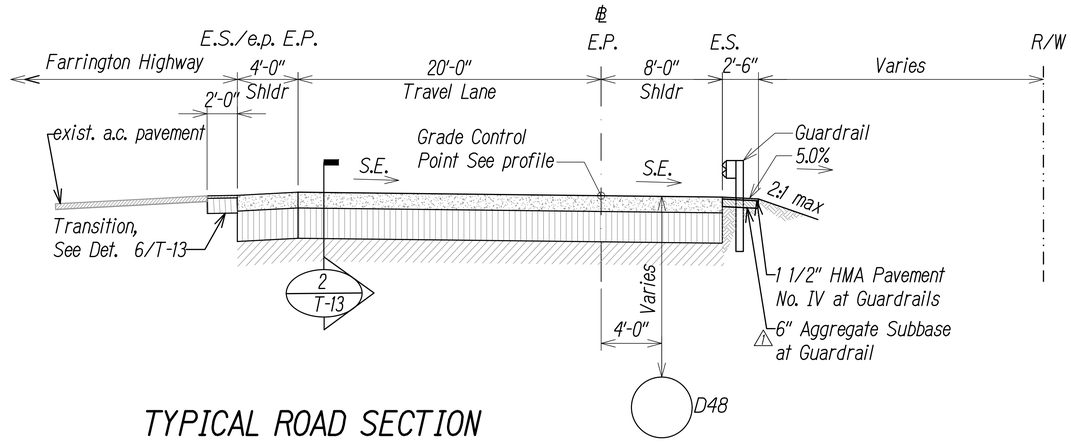
1 / RS-8



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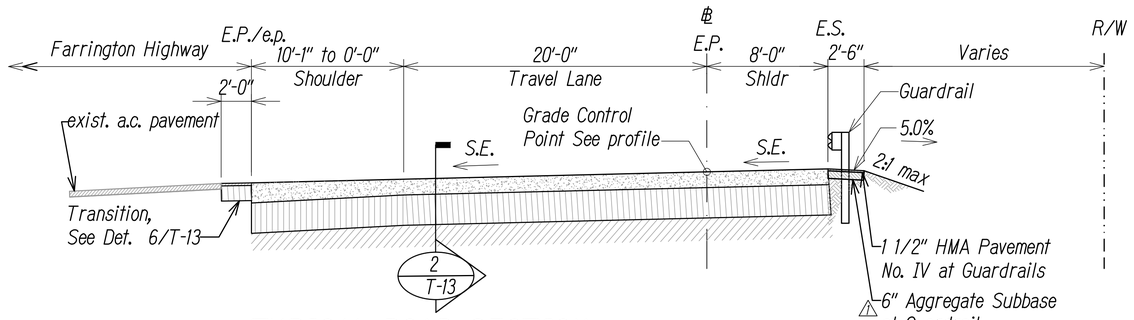
Scale: 1"=5'-0"

2 / RS-8



TYPICAL ROAD SECTION
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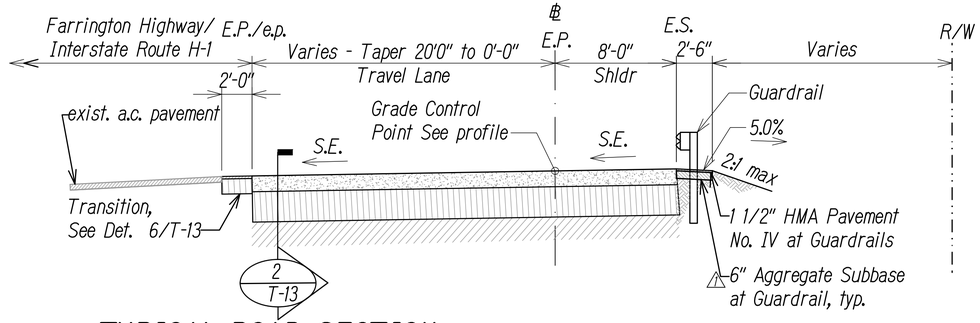
Scale: 1"=5'-0"

3 / RS-8



TYPICAL ROAD SECTION
℄ STA. 11+20.00 TO STA. 18+21.52 - RAMP SB

Scale: 1"=5'-0"

4 / RS-8

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
No.	TRACED BY	
	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

	DATE	REVISION
⚠1	10/21/2022	Added 6" Aggregate Subbase at guardrails

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL SECTIONS 8

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

Scale: As Noted Date: August 2022

CHRISTOPHER H. BALL
LICENSED PROFESSIONAL ENGINEER
No. 12144-C
HAWAII, U.S.A.

This work was prepared by me or under my supervision

MITSUNAGA & ASSOCIATES, INC. 4/30/2024 EXP. DATE

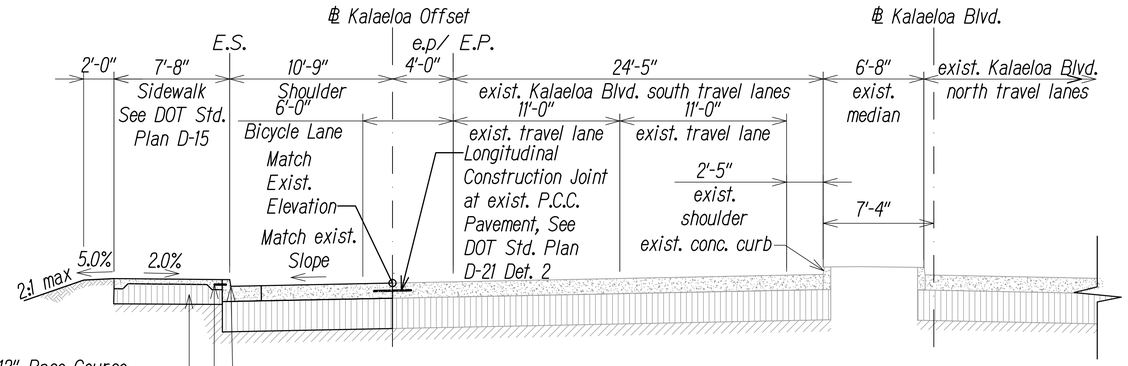
NOTE: Contractor to check and verify dimensions at job before proceeding with work.

Graphic Scale
1" = 5' 5' 0 5' 10'

SHEET No. **RS-8** OF **167** SHEETS

ADD. 26

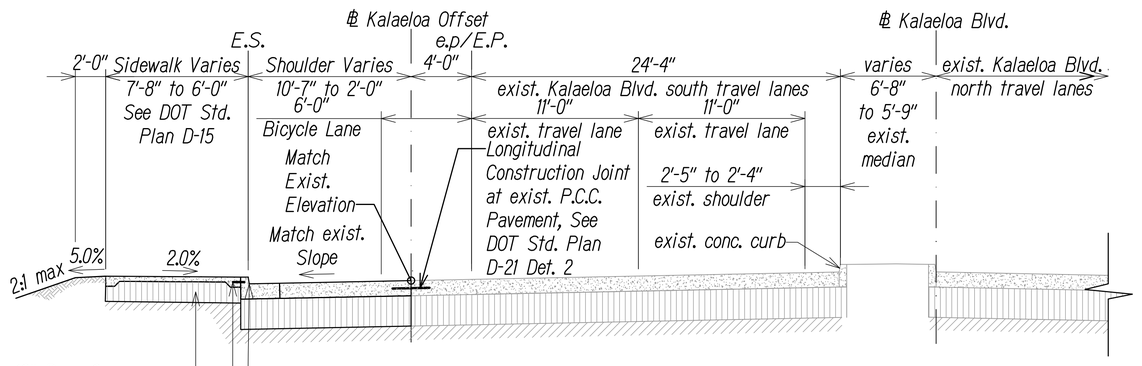
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 27	167



TYPICAL ROAD SECTION
℄ STA. 0+00 - KALAELOA OFFSET

Scale: 1"=5'-0"

1 RS-9



TYPICAL ROAD SECTION
℄ STA. 0+00 - STA. 0+92.34 KALAELOA OFFSET

Scale: 1"=5'-0"

2 RS-9

TYPICAL ROAD SECTION
℄ STA. 0+92.34 TO STA. 3+40.60 - KALAELOA OFFSET

Scale: 1"=5'-0"

3 RS-9

TYPICAL ROAD SECTION
℄ STA. 3+40.60 TO STA. 5+20.66 - KALAELOA OFFSET

Scale: 1"=5'-0"

4 RS-9

ORIGINAL PLAN	NOTE BOOK	No.
SURVEY PLOTTED BY	DATE
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TRACED BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	

⚠	DATE	REVISION
	10/21/2022	Added 6" Aggregate Subbase at guardrails

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL SECTIONS 9

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

Scale: As Noted Date: August 2022

CHRISTOPHER H. BALL * LICENSED PROFESSIONAL ENGINEER No. 12144-C * HAWAII, U.S.A.

This work was prepared by me or under my supervision

4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

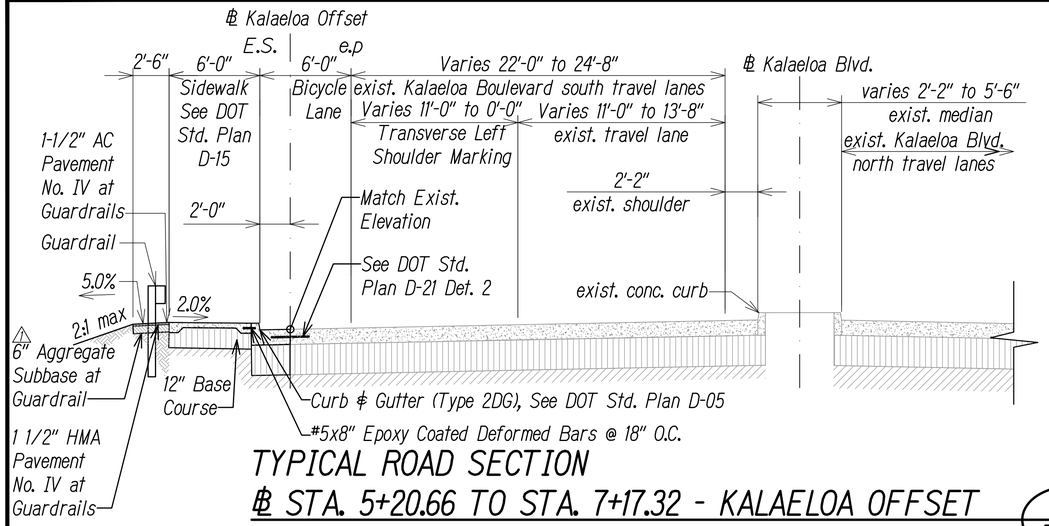
NOTE: Contractor to check and verify dimensions at job before proceeding with work.

Graphic Scale
1" = 5' 5' 0 5' 10'

SHEET No. **RS-9** OF **167** SHEETS

ADD. 27

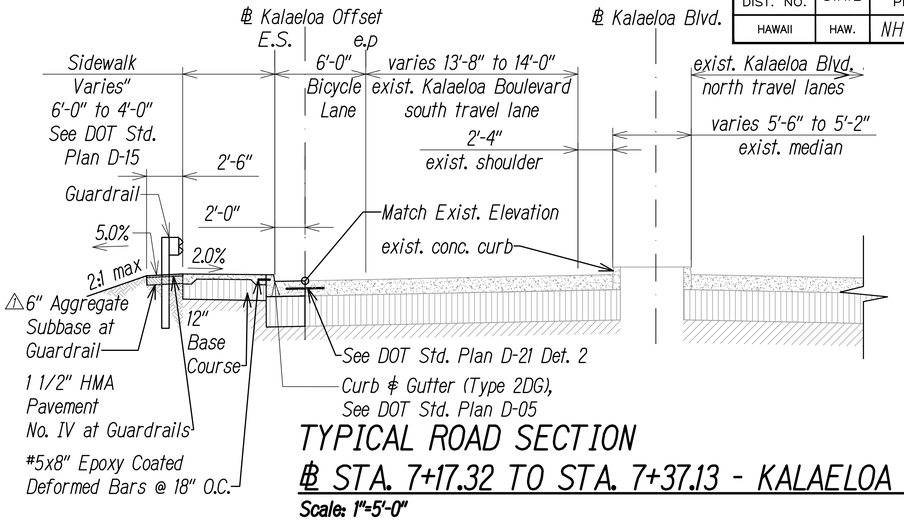
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 28	167



TYPICAL ROAD SECTION
℄ STA. 5+20.66 TO STA. 7+17.32 - KALAELOA OFFSET

Scale: 1"=5'-0"

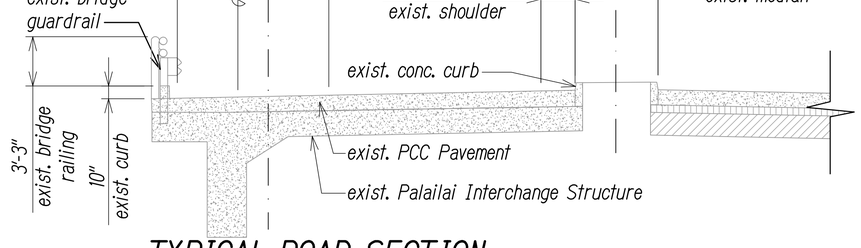
1 RS-10



TYPICAL ROAD SECTION
℄ STA. 7+17.32 TO STA. 7+37.13 - KALAELOA OFFSET

Scale: 1"=5'-0"

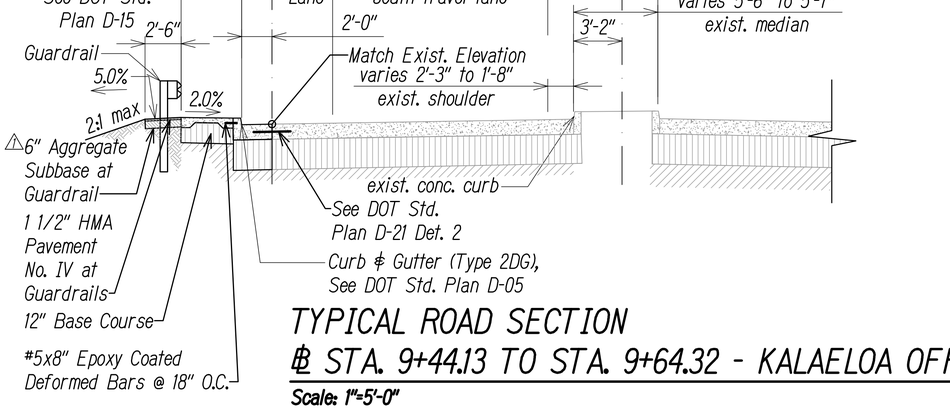
2 RS-10



TYPICAL ROAD SECTION
℄ STA. 7+37.13 TO STA. 9+44.13 - KALAELOA OFFSET

Scale: 1"=5'-0"

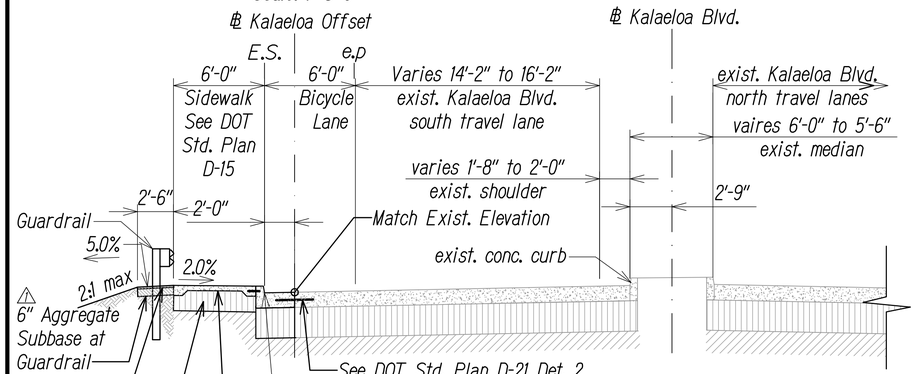
3 RS-10



TYPICAL ROAD SECTION
℄ STA. 9+44.13 TO STA. 9+64.32 - KALAELOA OFFSET

Scale: 1"=5'-0"

4 RS-10



TYPICAL ROAD SECTION
℄ STA. 9+64.32 TO STA. 11+39.15 - KALAELOA OFFSET

Scale: 1"=5'-0"

5 RS-10

DATE	REVISION
⚠ 10/21/2022	Added 6" Aggregate Subbase at guardrails

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL SECTIONS 10

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

Scale: As Noted Date: August 2022

SHEET No. **RS-10** OF **167** SHEETS

CHRISTOPHER H. BALL
LICENSED PROFESSIONAL ENGINEER
No. 12144-C
HAWAII, U.S.A.

This work was prepared by me or under my supervision

Chris Ball 4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

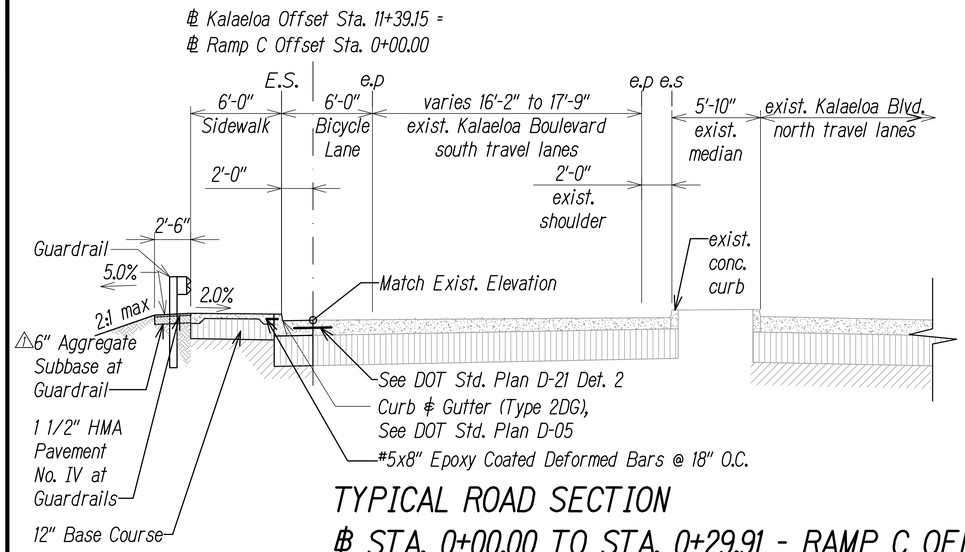
NOTE: Contractor to check and verify dimensions at job before proceeding with work.

Graphic Scale
1" = 5' 5' 0 5' 10'

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
	TRACED BY	
	DESIGNED BY	
	QUANTITIES BY	
No.	CHECKED BY	

ADD. 28

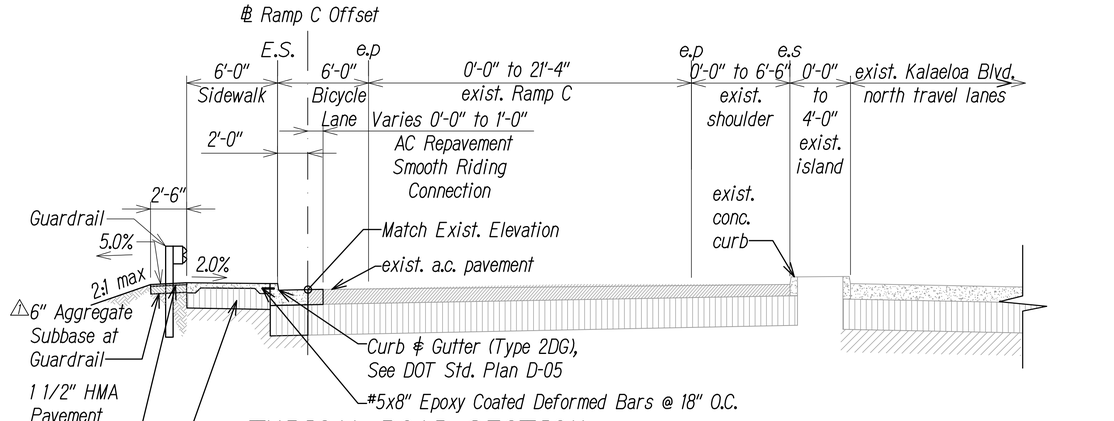
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 29	167



TYPICAL ROAD SECTION
℄ STA. 0+00.00 TO STA. 0+29.91 - RAMP C OFFSET

Scale: 1"=5'-0"

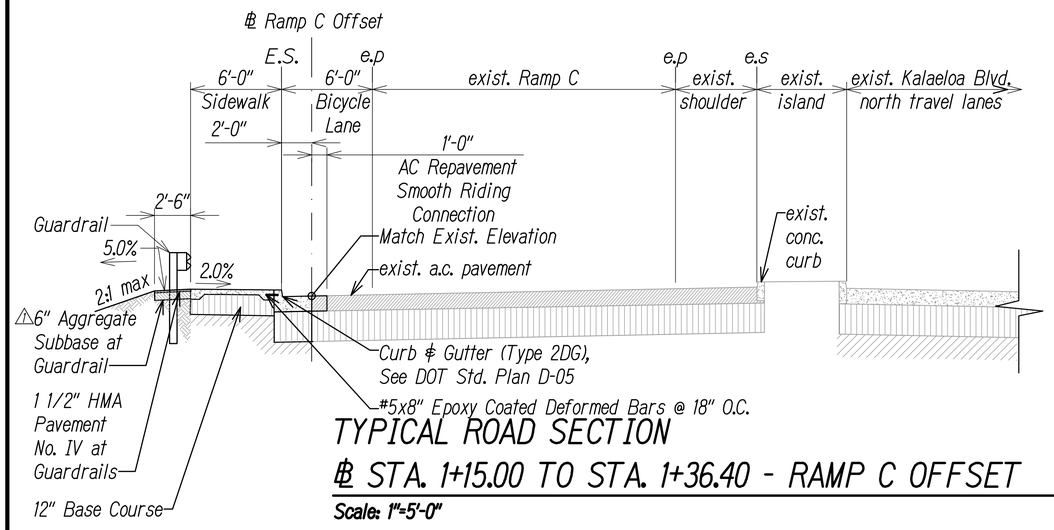
1 RS-11



TYPICAL ROAD SECTION
℄ STA. 0+29.91 TO STA. 1+15.00 - RAMP C OFFSET

Scale: 1"=5'-0"

2 RS-11



TYPICAL ROAD SECTION
℄ STA. 1+15.00 TO STA. 1+36.40 - RAMP C OFFSET

Scale: 1"=5'-0"

3 RS-11

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
No.	TRACED BY	
	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

Graphic Scale

1" = 5' 5' 0 5' 10'

⚠	10/21/2022	Added 6" Aggregate Subbase at guardrails
	DATE	REVISION

CHRISTOPHER H. BALL — LICENSED PROFESSIONAL ENGINEER — No. 12144-C — HAWAII, U.S.A.

This work was prepared by me or under my supervision

Chris Ball 4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL SECTIONS 11

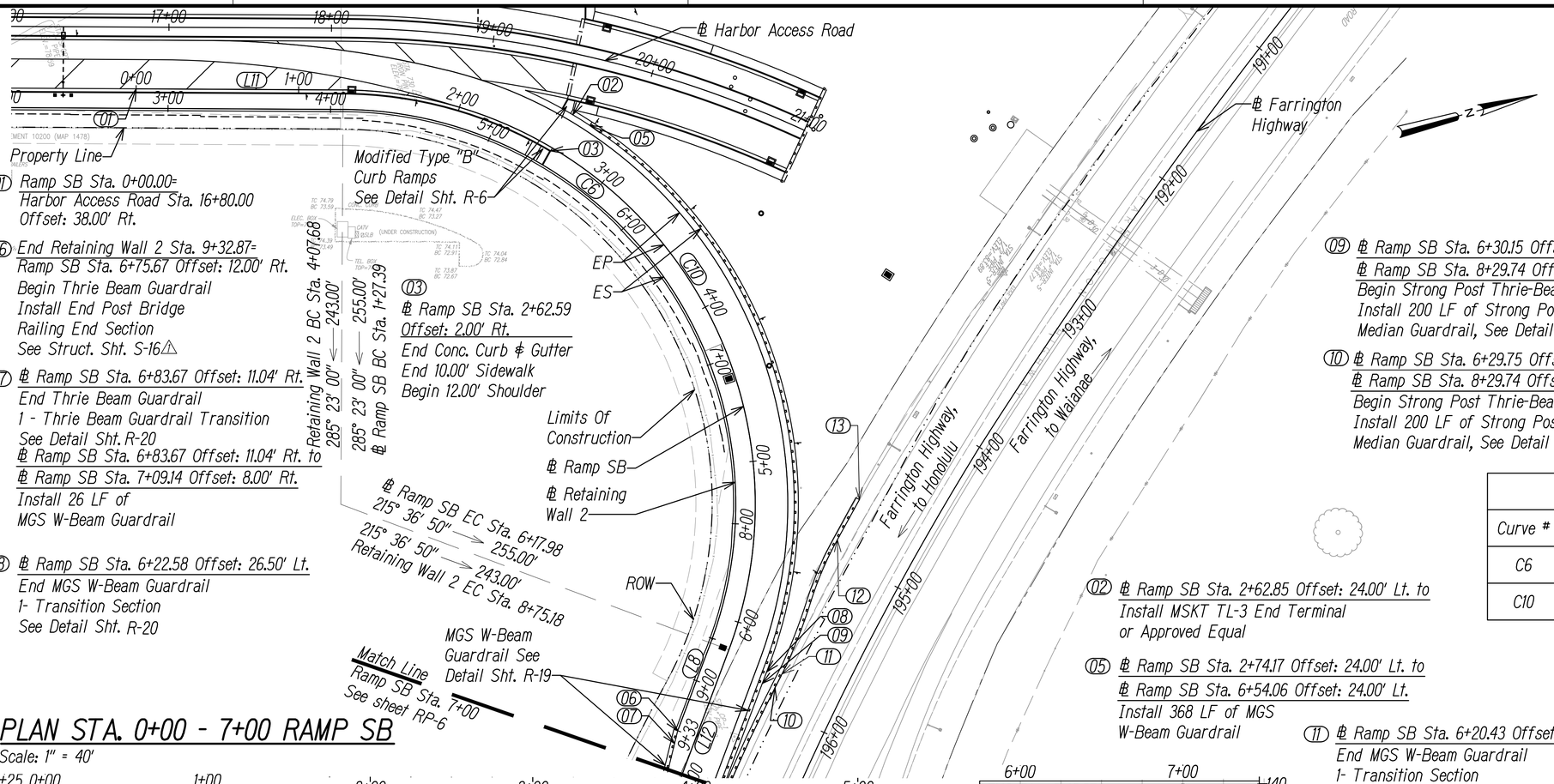
INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

Scale: As Noted Date: August 2022

SHEET No. **RS-11** OF **167** SHEETS

ADD. 29

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 34	167



(01) Ramp SB Sta. 0+00.00=
Harbor Access Road Sta. 16+80.00
Offset: 38.00' Rt.

(06) End Retaining Wall 2 Sta. 9+32.87=
Ramp SB Sta. 6+75.67 Offset: 12.00' Rt.
Begin Thrie Beam Guardrail
Install End Post Bridge
Railing End Section
See Struct. Sht. S-16⚠

(07) ℄ Ramp SB Sta. 6+83.67 Offset: 11.04' Rt.
End Thrie Beam Guardrail
1 - Thrie Beam Guardrail Transition
See Detail Sht. R-20
℄ Ramp SB Sta. 6+83.67 Offset: 11.04' Rt. to
℄ Ramp SB Sta. 7+09.14 Offset: 8.00' Rt.
Install 26 LF of
MGS W-Beam Guardrail

(08) ℄ Ramp SB Sta. 6+22.58 Offset: 26.50' Lt.
End MGS W-Beam Guardrail
1- Transition Section
See Detail Sht. R-20

(03) ℄ Ramp SB Sta. 2+62.59
Offset: 2.00' Rt.
End Conc. Curb & Gutter
End 10.00' Sidewalk
Begin 12.00' Shoulder

(09) ℄ Ramp SB Sta. 6+30.15 Offset: 26.50' Lt. to
℄ Ramp SB Sta. 8+29.74 Offset: 24.00' Lt.
Begin Strong Post Thrie-Beam Median Guardrail
Install 200 LF of Strong Post Thrie-Beam
Median Guardrail, See Detail Sht. R-20

(10) ℄ Ramp SB Sta. 6+29.75 Offset: 34.76' Lt. to
℄ Ramp SB Sta. 8+29.74 Offset: 26.50' Lt.
Begin Strong Post Thrie-Beam Median Guardrail
Install 200 LF of Strong Post Thrie-Beam
Median Guardrail, See Detail Sht. R-20

Line Data		
Line #	Length	Direction
L8	57.69'	305°36'50"
L11	127.39'	195°23'00"
L12	182.32'	305°36'50"

Curve Data						
Curve #	Δ	Δ/2	R	C	Lc	T
C6	110°13'50"	55°06'55"	243.00'	467.50'	398.67'	348.53'
C10	110°13'50"	55°06'55"	255.00'	490.59'	418.35'	365.74'

(02) ℄ Ramp SB Sta. 2+62.85 Offset: 24.00' Lt. to
Install MSKT TL-3 End Terminal
or Approved Equal

(05) ℄ Ramp SB Sta. 2+74.17 Offset: 24.00' Lt. to
℄ Ramp SB Sta. 6+54.06 Offset: 24.00' Lt.
Install 368 LF of MGS
W-Beam Guardrail

(11) ℄ Ramp SB Sta. 6+20.43 Offset: 35.75' Lt.
End MGS W-Beam Guardrail
1- Transition Section
See Detail Sht. R-20

(12) ℄ Ramp SB Sta. 5+44.65 Offset: 51.31' Lt. to
℄ Ramp SB Sta. 6+20.43 Offset: 35.75' Lt.
Replace exist. guardrail ∉
Install 76 LF of
MGS W-Beam Guardrail
See Detail Sht. R-20

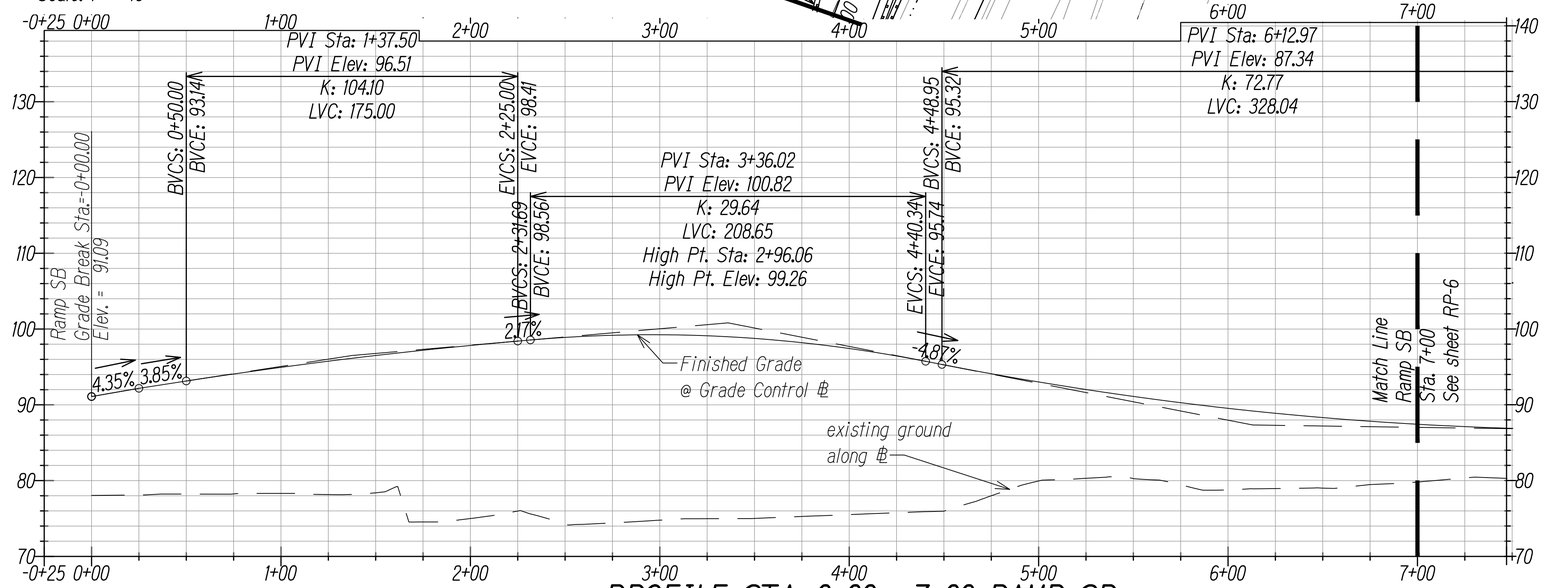
(13) ℄ Ramp SB Sta. 5+24.20 Offset: 64.07' Lt. to
℄ Ramp SB Sta. 5+44.65 Offset: 51.31' Lt.
Install MGS Transition to
Strong Post Guardrail
See Detail Sht. R-23
Conn. to exist. guardrail
1-Reset Guardrail (25 LF)

Legend
Limits of Construction
Guardrail
Property Line

Note:
1. See sheet RS-7 and RS-8 for typical sections.

PLAN STA. 0+00 - 7+00 RAMP SB

Scale: 1" = 40'



PROFILE STA. 0+00 - 7+00 RAMP SB

Scale: Hori: 1" = 40'
Vert: 1" = 10'

Graphic Scale
1" = 40' 40' 20' 0 40' 80'
1" = 10' 10' 5' 0 10' 20'

DATE	REVISION
10/21/2022	Revised reference on callout 6

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RAMP SB PLAN AND PROFILE 1

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

Scale: As Noted Date: August 2022

CHRISTOPHER H. BALL
LICENSED PROFESSIONAL ENGINEER
No. 12144-C
HAWAII, U.S.A.

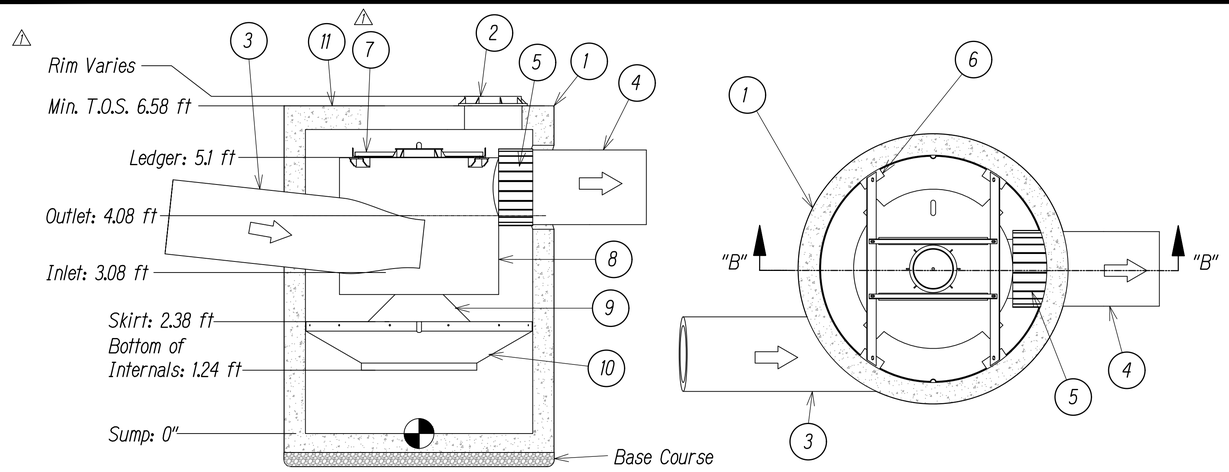
This work was prepared by me or under my supervision

Chris Ball 4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

ORIGINAL PLAN | NOTE BOOK | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE | No.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 44	167



Section "B-B"

Plan

Capacities:

1. Peak Treatment Flow: 3.0 cfs
2. Sediment Storage Capacity: 0.70 cu yd.
3. Oil Storage Capacity: 70 gal

Parts List		
Item	Description	Size
1	Precast Manhole	48 in
2	Frame and Cover	30 in
2A	Frame and Cover	
3	Inlet Pipe 2	12 in
4	Outlet Pipe 1	12 in
5	Pipe Coupling	
6	Ledger Angle	
7	Support Frame	
8	Dip Plate	
9	Center Shaft and Cone	
10	Benching Skirt	
11	Materials and Labor to Achieve Final Grade	

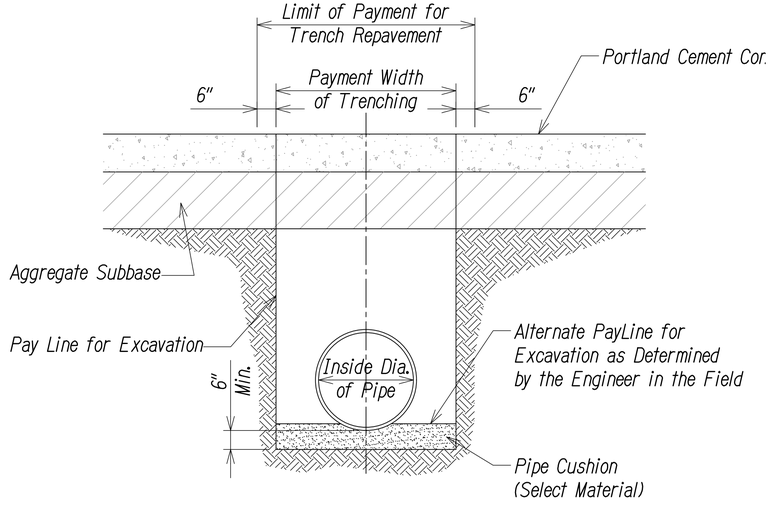
Hydrodynamic Separator Specifications:

1. The system shall be installed in strict accordance with the Site & Grading Plans and the manufacturer's general arrangement drawings and handling, storage and installation instructions. The Contractor shall be responsible for installing the equipment and all necessary site connections.
2. The precast concrete structure shall be set on a granular or compacted sand sub-base in accordance with the standard manhole installation. In no instances shall the compacted sub-base material have a thickness of less than 12 in.
3. The precast concrete structure shall be set level and plumb to within 0.5%.
4. Non-shrink grout or hydraulic cement conforming to ASTM C595 shall be used to provide a water tight seal in the lift holes, and drain holes and around the concrete knock-outs for the inlet and outlet pipes.
5. The Contractor shall, at the discretion of the Engineer or the Engineer's Representative, test the concrete structure for water tightness before backfilling.
6. The unit shall be manufactured with materials typically use in storm water drainage systems that have a minimum life expectancy of 30 years.
7. The outlet pipe stub (not shown) is a roto-molded product with an I.D. of 18 in. that cannot be modified. To avoid the use of a reducer or expander on the outlet a 18 in. outlet pipe should be used if possible. The orientation of the outlet pipe can be adjusted to suit site conditions.
8. Maximum pipe size is 18 in. The inlet pipe invert should be placed one inlet pipe diameter below the outlet pipe invert. The I.D. of the inlet pipe should be placed tangent to the I.D. of the manhole. The orientation of the inlet pipe can be adjusted to suit site conditions. Head-loss at 8.0 cfs with a 18 in. inlet: 12 in. head-loss will increase with smaller inlet pipes.
9. Sediment shall be stored in a zone that is isolated from the main flow path and protected from re-entrainment by the benching skirt.
10. Dimensions are general and intended for guidance only.

4' HYDRODYNAMIC SEPARATOR UNIT

Not to Scale

1 / R-8



Drain Pipe Size	Payment Width of Trenching	Width of Repaving
18"	54"	66"
24"	60"	72"
30"	66"	78"
36"	72"	84"
42"	78"	90"
48"	84"	96"

PAYMENT TRENCH WIDTH FOR DRAIN PIPE

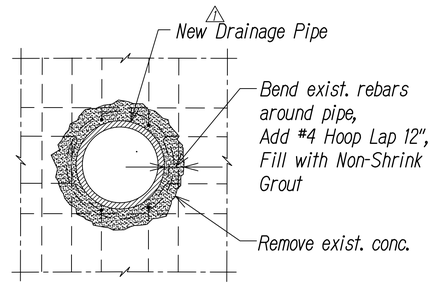
Scale: Not to Scale

2 / R-8

Graphic Scale

1" = 1'-0" (1 0 1 2)

3/8" = 1'-0" (2 1 0 2 4)



PIPE PENETRATION DETAIL

Scale: 1" = 1'-0"

4 / R-8

DATE	REVISION
10/21/2022	Revised det 1 from 6' to 4', removed det 3 removed pipe size from det 4

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS 1

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

Scale: As Noted Date: August 2022

CHRISTOPHER H. BALL
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HAWAII, U.S.A.

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4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

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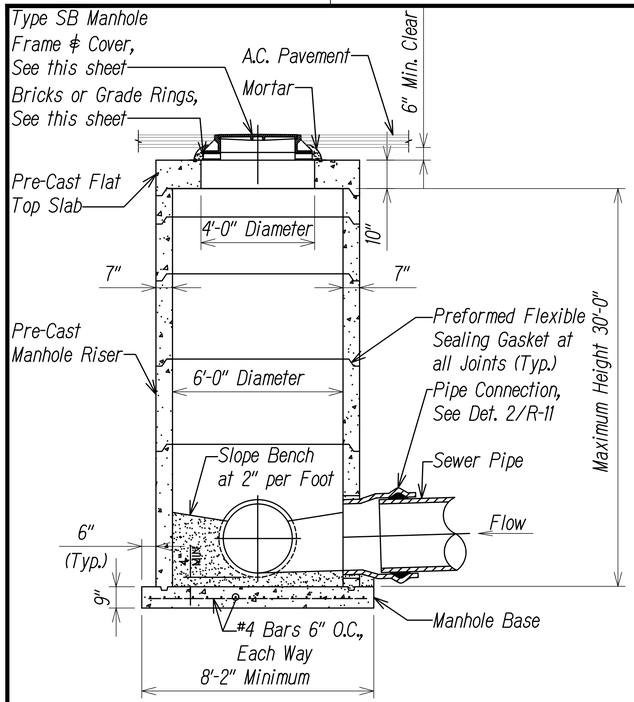
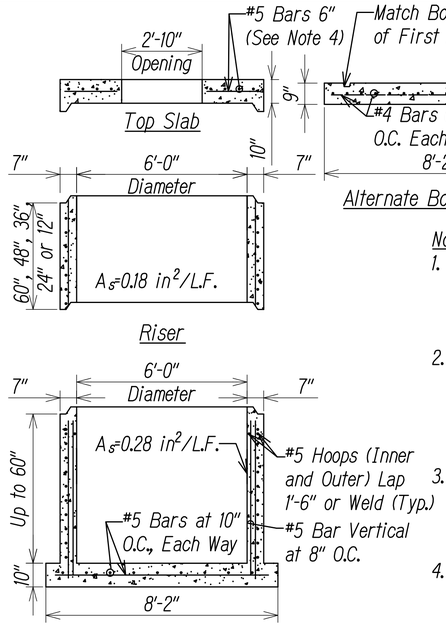
ORIGINAL PLAN
NOTE BOOK
No.
SURVEY PLOTTED BY DATE
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-HI-1(271)	2022	ADD. 47	167



6-FOOT DIAMETER PRE-CAST CONC. MANHOLE



PRE-CAST CONC. MANHOLE SECTIONS

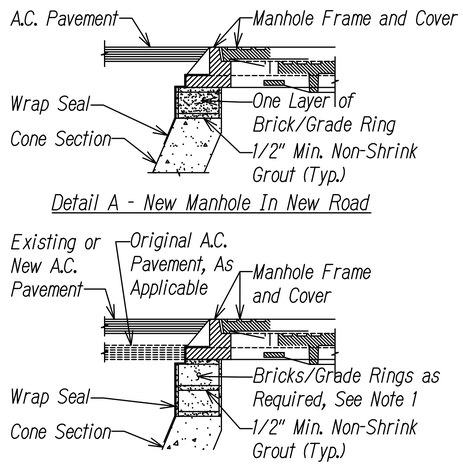
6' DIAMETER PRE-CAST SEWER MANHOLE

Scale: 3/8"=1'-0"

1 / R-11

Notes:

1. Pre-Cast Sections Shall Conform to ASTM C478 and the AASHTO LRFD Specifications.
2. Manufacturers May Submit to the City for Approval, Prior to Manufacturing, Designs Other than Those Shown on This Sheet.
3. Install Pre-cast Flexible Sealing Gasket Conforming to ASTM C990 at all Manhole Joints.
4. Top Slab shall be Designed for AASHTO HS-20 Wheel Loading.
5. Steel Indicated (A_s) is Minimum Required.
6. Structural Analysis Required.

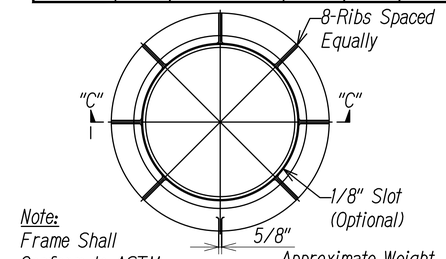


Note:

1. Apply Grout to Inside and Outside of Bricks to Form Continuous Cylindrical Surface.

GRADE RING, LEVEL, ADJUSTEMENT, AND MANHOLE COVER LOCATED IN A.C. PAVEMENT

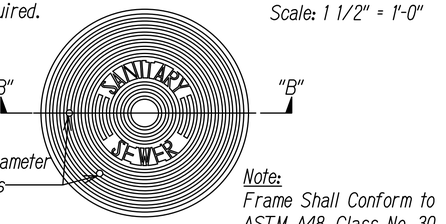
Scale: 1 1/2" = 1'-0"



Note:
Frame Shall Conform to ASTM A48, Class No. 30.

Approximate Weight
480 Pounds

MANHOLE FRAME - TYPE SB

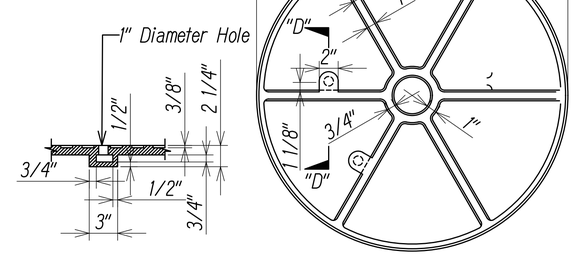


MANHOLE COVER - TYPE SB, TOP VIEW

Note:

1. Frame Shall Conform to ASTM A48, Class No. 30.

Approximate Weight
480 Pounds



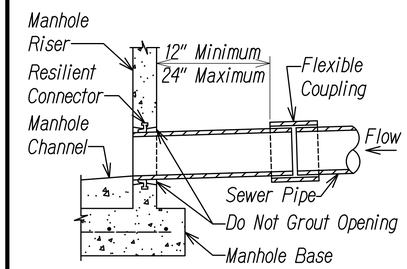
MANHOLE COVER - TYPE SB, BOTTOM VIEW

Graphic Scale

1 1/2"= 1'-0" 1 0 1 2

3/4"= 1'-0" 1 0 1 2

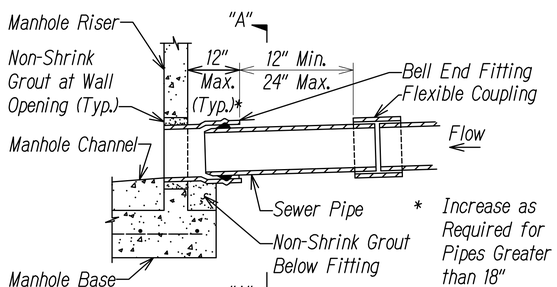
3/8"= 1'-0" 2 1 0 2 4



Notes:

1. Resilient Connector shall Conform with ASTM C923.
2. Resilient Connector shall be Installed in Accordance with Manufacturer's Recommendations.
3. For Pipe Connections at Existing Manholes, the Contractor may Core or Drill an Opening in the Manhole Wall and Grout in the Resilient Connector per the Resilient Connector Manufacturer's Recommendations.

MANHOLE PIPE CONNECTION - WALL PIPE FITTING



* Increase as Required for Pipes Greater than 18"

MANHOLE PIPE CONNECTION - RESILIENT CONNECTOR

Notes:

1. For PVC Pipe, Provide Pre-manufactured, Approved PVC Sanded Manhole Adapter with Gasketed Bell End. For VCP, Provide Gasketed Bell End.
2. A Gasketed Flexible Bell End may be used in lieu of a Flexible Coupling.
3. Bell End Fitting used on Influent Sewer Pipe. Plain End used on Effluent Pipe.

MANHOLE PIPE CONNECTION DETAIL

Scale: 3/4"=1'-0"

2 / R-11

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE

NOTE BOOK | No.

Approved:

Chief, Wastewater Branch, DPP — Date

DATE	REVISION
10/21/2022	Revised sheet number

CHRISTOPHER H. BALL — LICENSED PROFESSIONAL ENGINEER — No. 12144-C — HAWAII, U.S.A.

This work was prepared by me or under my supervision

4/30/2024

MITSUNAGA & ASSOCIATES, INC. EXP. DATE

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SEWER DETAILS 2

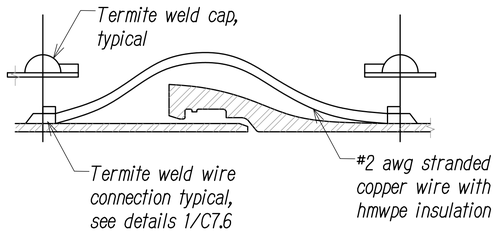
INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-HI-1(271)

Scale: As Noted Date: August 2022

SHEET No. **R-11** OF **167** SHEETS

ADD. 47

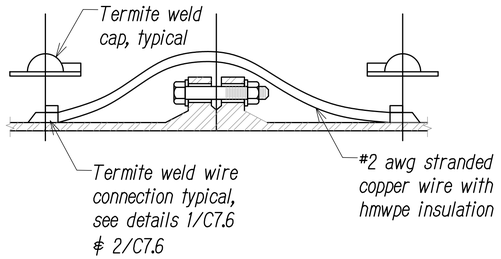
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 49	167



Note:

Install two bond wires at each pipe joint on pipe 24 inches larger.

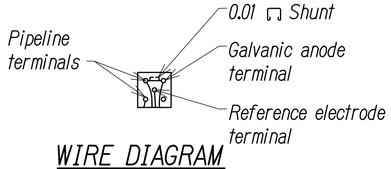
PUSH-ON JOINT BOND (1 / R-13)
Not to Scale



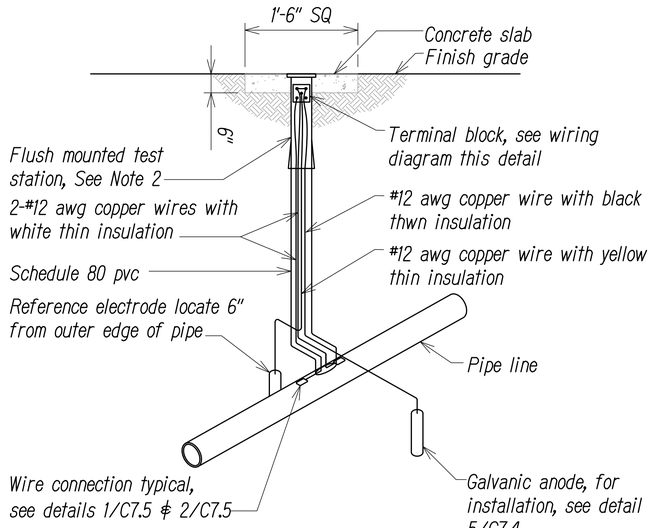
Note:

Install two bond wires at each pipe joint on pipe 24 inches larger.

FLANGED JOINT BOND (2 / R-13)
Not to Scale

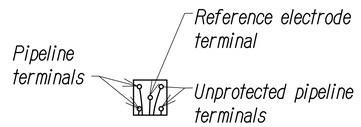


WIRE DIAGRAM

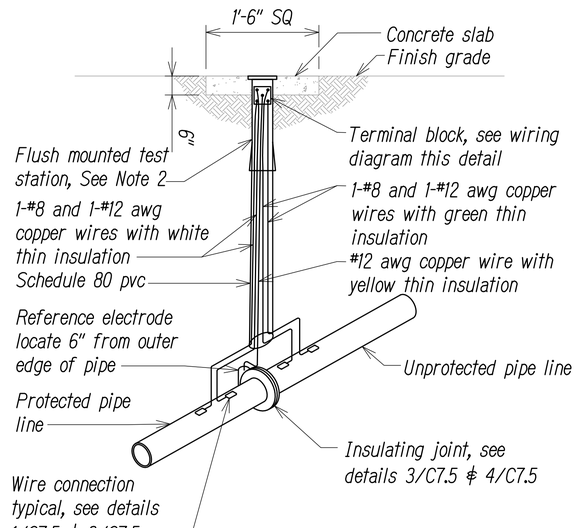


TYPE T

FLUSH MOUNTED TEST STATION WITH ANODE (3 / R-13)
Not to Scale

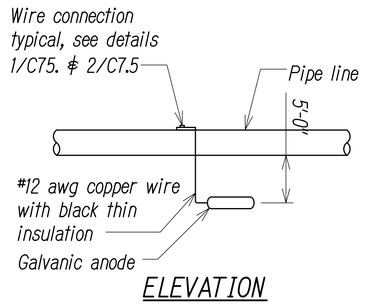


WIRE DIAGRAM



TYPE I

FLUSH MOUNTED TEST STATION (4 / R-13)
Not to Scale



ELEVATION

GALVANIC ANODE INSTALLATION (5 / R-13)
Not to Scale

Notes:

1. All test stations shall be in accordance with the 2021 Water System External Corrosion Control Standards (WSECCS).
2. All test stations shall be out of the travel way.
3. See BWS WSECCS Std. Det. CP01 for the Flush Mounted Test Station Detail. For Non-Potable Waterline, add "NPW CP-TEST" on cast-iron cover.
4. All cathodic protection work shall be paid under bid item 624.0100 Water Systems.

Approved:

Manager and Chief Engineer, BWS — Date
(For work affecting BWS facilities in City/State R/W and easements only)

⚠	10/21/2022	Added note 4
	DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WATER DETAILS 2

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

Scale: As Noted Date: August 2022

CHRISTOPHER H. BALL — LICENSED PROFESSIONAL ENGINEER — No. 12144-C — HAWAII, U.S.A.

This work was prepared by me or under my supervision

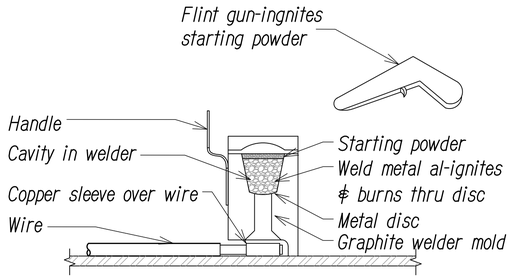
4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

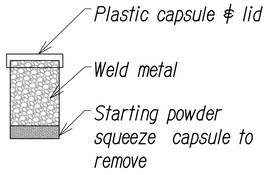
SHEET No. R-13 OF 167 SHEETS

ORIGINAL PLAN
NOTE BOOK
No.
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

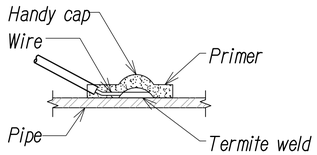
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 50	167



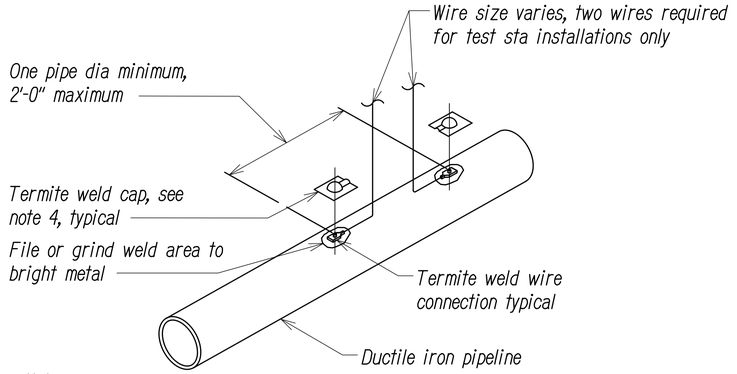
THERMITE WELD



WELD METAL CAPSULE
(TYPE & SIZE VARIES)



FINISHED WELD
(WIRE BRAZED TO PIPE)

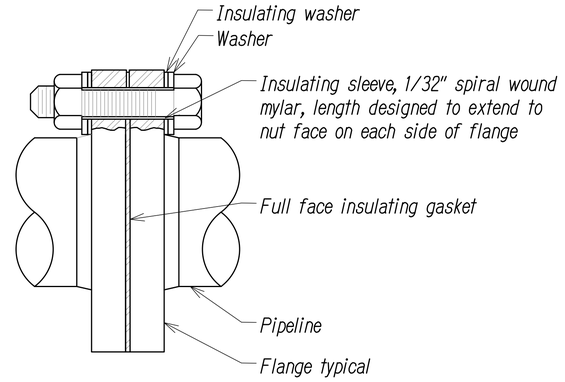


Notes:

1. Copper sleeve required for termite welding of #10 awg smaller wire.
2. Use copper sleeve on #2 awg joint bonding wires.
3. Welder and cartridge size varies according to wire size and pipe material, consult welder manufacturer for recommended welder and cartridge.
4. Coat weld area and fill recess on termite weld cap with cold applied coal tar mastic and apply cap weld.

TERMITE WELD WIRE CONNECTION (1)
Not to Scale
R-14

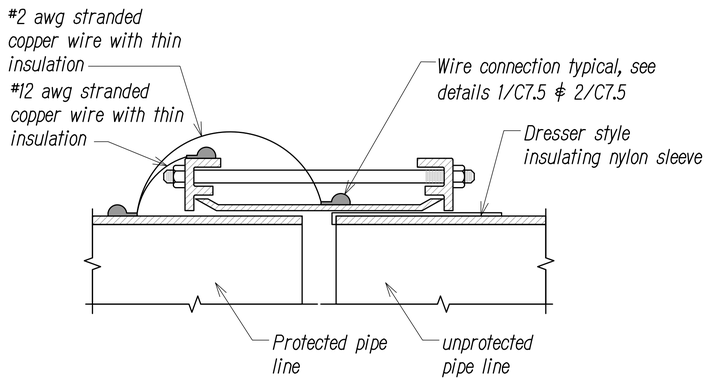
WIRE CONNECTION FOR DUCTILE IRON PIPE (2)
Not to Scale
R-14



Notes:

1. Install insulating washer on the unprotected side of flange.
2. Coat with cold applied coal tar mastic after assembling joint and wrap with a butyl rubber adhesive, polyethlene backed tape.

INSULATING FLANGE (3)
Not to Scale
R-14



INSULATED FLEXIBLE COUPLING (4)
Not to Scale
R-14

Notes:

1. All test stations shall be in accordance with the 2021 Water System External Corrosion Control Standards (WSECCS).
2. All test stations shall be out of the travel way.
3. All cathodic protection work shall be paid under bid item 624.0100 Water Systems.

Approved:

Manager and Chief Engineer, BWS Date
(For work affecting BWS facilities in City/State R/W and easements only)

ORIGINAL PLAN
NOTE BOOK
No.
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

CHRISTOPHER H. BALL
LICENSED PROFESSIONAL ENGINEER
No. 12144-C
HAWAII, U.S.A.

This work was prepared by me or under my supervision

4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

⚠	10/21/2022	Added note 3
	DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

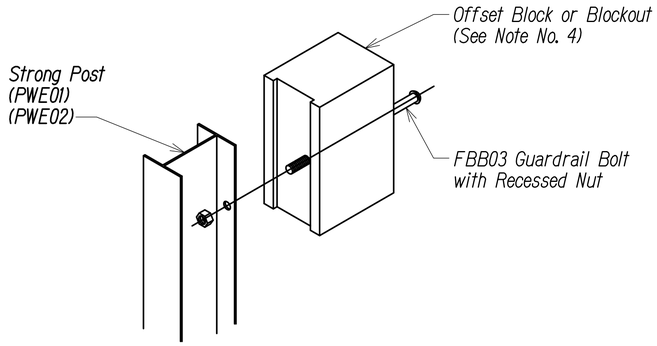
WATER DETAILS 3

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

Scale: As Noted Date: August 2022

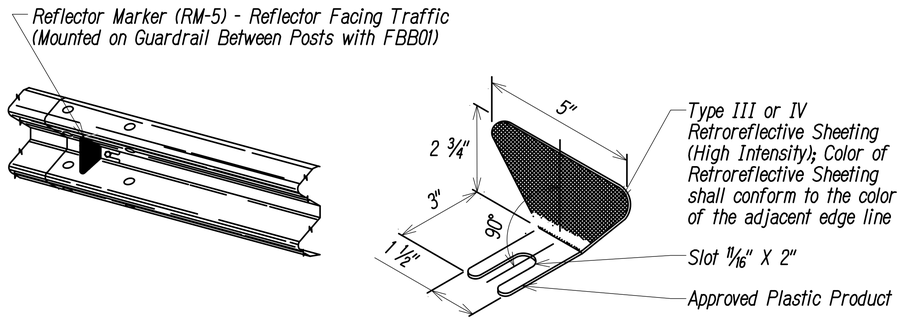
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-HI-1(271)	2022	ADD. 52	167

GUARDRAIL TYPE	Dimension	
	H	A
MGS w/ Standard 8" Offset Block	2'-1"	1'-6"
MGS w/ No Blockout	2 7/8"	9 1/4"

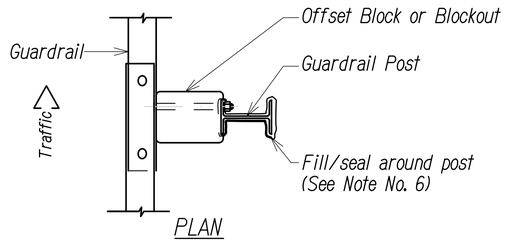


Exploded View
(Rail & Washer Not Shown)

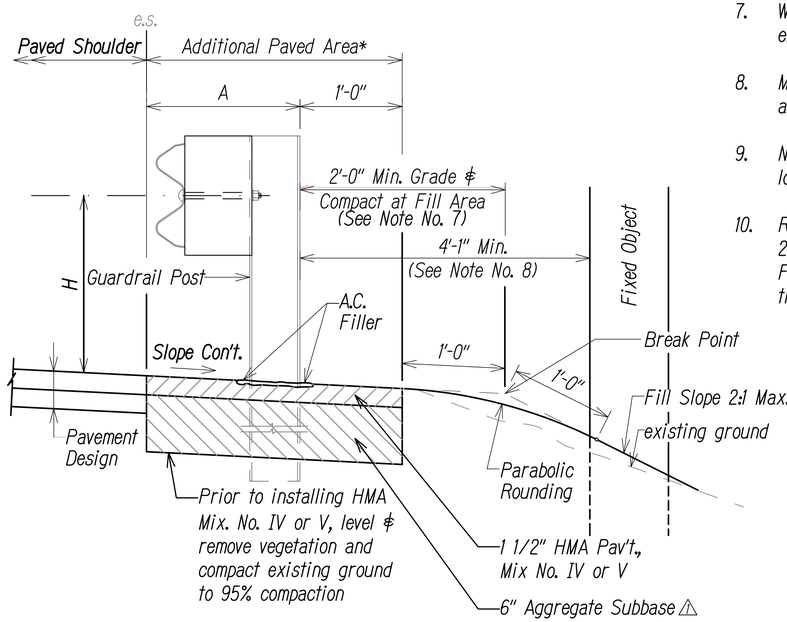
STEEL POST AND BLOCK DETAIL



REFLECTOR MARKER (RM-5) DETAIL & TYPICAL INSTALLATION



PLAN



ELEVATION

TYPICAL GUARDRAIL INSTALLATION

REDUCED PLAN
(HALF SIZE)
0 1 2 3
3 INCHES OF ORIGINAL PLAN

General Notes

1. All hardware, posts and fasteners shall be hot-dip zinc coated galvanized after fabrication. No punching, drilling or cutting will be permitted after galvanizing.
2. Where conditions require, special post lengths in increments of 6 inches may be specified by the Engineer.
3. All fasteners, posts, and rail elements (i.e. FBB03, PWE01, RWM04b, etc.) shall conform to the latest edition and amendments of "A Guide to Standardized Highway Barrier Rail Hardware", a report prepared and approved by the AASHTO-AGC-ARTBA Joint Cooperative Committee, Subcommittee On New Highway Materials, Task Force 13 Report. Dimensions of fasteners, posts and rail elements have been converted from metric units into their present form.
4. The Blockout or Offset Block shall be approved by the State.
5. All new guardrail systems (system consists of total length of guardrail including both end treatments) shall include the Additional Paved Area.
6. After the guardrail posts are installed in the paved area, the Contractor shall fill/seal around each guardrail post and all cracks in the paved area caused during the guardrail post installation. If required by the inspector/engineer, the Contractor shall tamper the paved area around the guardrail post prior to filling/sealing. All costs associated with this work shall not be paid for separately, but shall be considered incidental to the various guardrail items.
7. When standards for the fill slope area cannot be met, a site specific, engineer approved design may be used.
8. Minimum working width (clear distance) between back of MGS post to any fixed object is 4'-1" (49").
9. New Hot Mix Asphalt (HMA) pavement at guardrails shall extend 6 feet longitudinally beyond terminal ends.
10. Reflector Markers (RM-5) mounted on guardrails shall be spaced every 25 feet. RM-5's shall not be installed on Terminal Sections. Furnishing and installing of each RM-5 shall be considered incidental to the adjacent guardrail system.

⚠	DATE	REVISION
⚠	10/21/2022	Replaced sheet with latest HDOT approved sheet and added 6" Aggregate Subbase

ORIGINAL PLAN
NOTE BOOK
No.
SURVEY PLOTTED BY
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TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

CHRISTOPHER H. BALL
LICENSED PROFESSIONAL ENGINEER
No. 12144-C
HAWAII, U.S.A.

This work was prepared by me or under my supervision

MITSUNAGA & ASSOCIATES, INC. 4/30/2024 EXP. DATE

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GUARDRAIL DETAIL AND NOTES

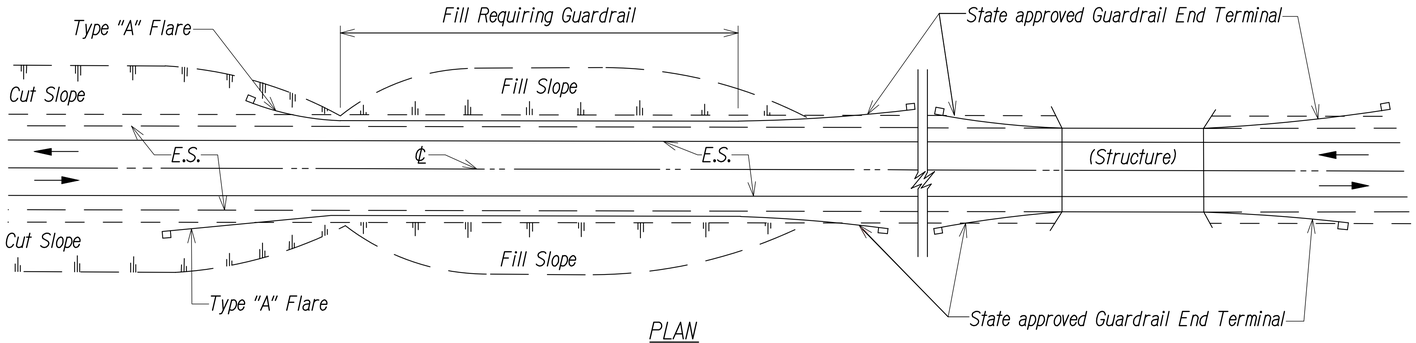
INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-HI-1(271)

Scale: As Noted Date: August 2022

SHEET No. **R-16** OF **167** SHEETS

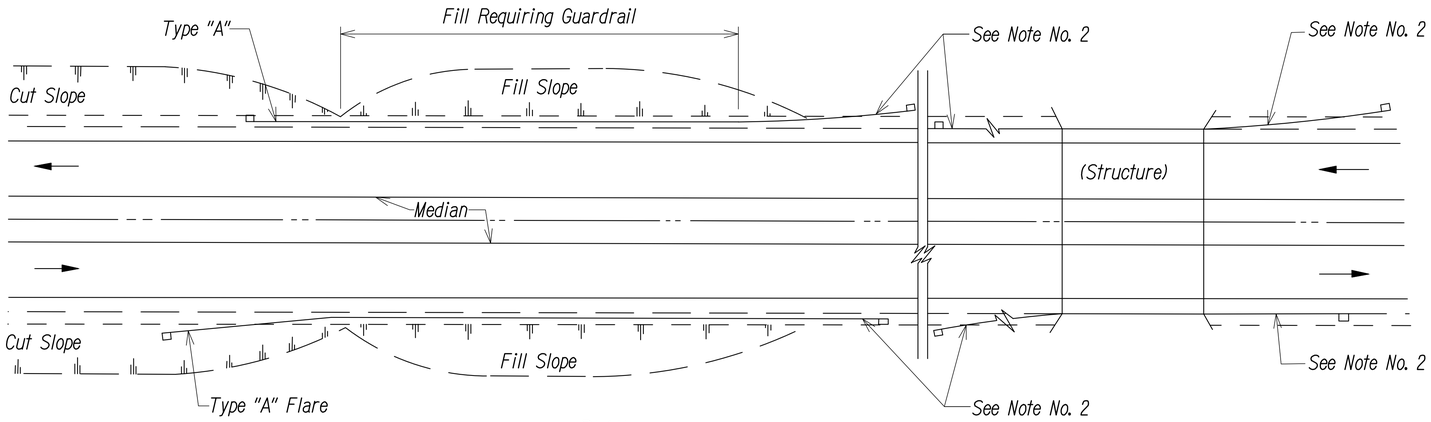
ADD. 52

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 53	167



PLAN

TWO WAY ROADWAY



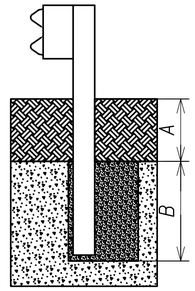
PLAN

ONE WAY ROADWAY (DIVIDED HIGHWAY)

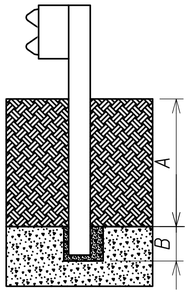
Notes:

1. Metal Guardrail connection to concrete structures requires End Post Connection. See Structure Plans.
2. Depending on the existing field conditions, the Engineer shall determine which guardrail end terminal should be installed.
3. Refer to State's most current approved Product List for MASH approved Guardrail End Terminals. ⚠

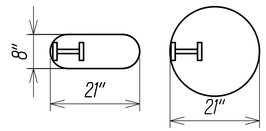
Case 1



Case 2



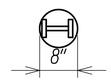
Soil Rock ASTM C33 Coarse Aggregate, Size No. 57



Plan View Steel Posts
Either hole configuration acceptable

(A) ranging from 0 to 18-inches, the depth of required drilling
(B) is equal to 24-inches.

Overlying Soil Depths of 0 to 18-inches



(A) ranging from 18-inches to the embedment depth of the post, depth of required drilling
(B) is equal to either 12-inches or the desired embedment depth minus the depth of soil whichever is less.

Overlying Soil Depths of 18 to 42-inches

Strong Post W-Beam Guardrail In Rock

⚠	10/21/2022	Revised note 3 to MASH
	DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GUARDRAIL DETAILS 1

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

Scale: As Noted Date: August 2022

CHRISTOPHER H. BALL ★ LICENSED PROFESSIONAL ENGINEER No. 12144-C ★ HAWAII, U.S.A.

This work was prepared by me or under my supervision

Chris Ball 4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

ORIGINAL PLAN
NOTE BOOK
No.
SURVEY PLOTTED BY
DRAWN BY
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DESIGNED BY
QUANTITIES BY
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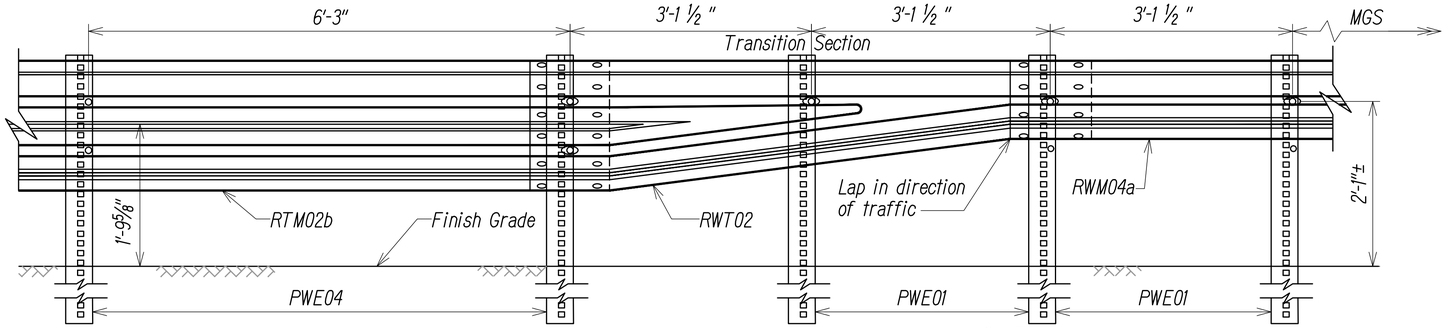
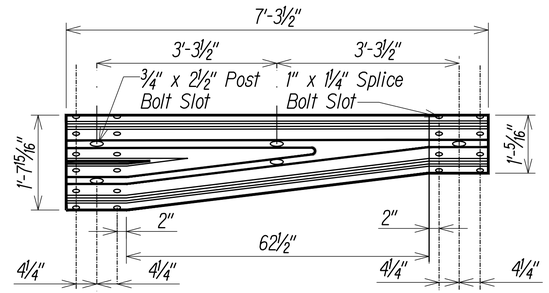
SHEET No. R-17 OF 167 SHEETS

ADD. 53

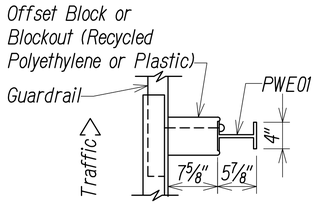
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 56	167

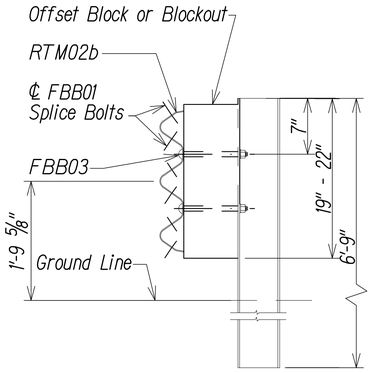


* Not to be used for Thrie Beam connection to structures.



TRANSITION SECTION (RWT02)

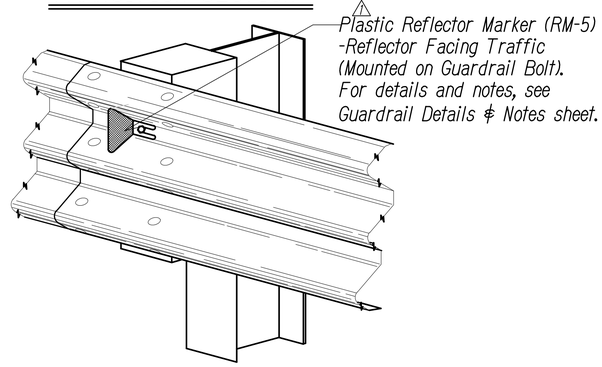




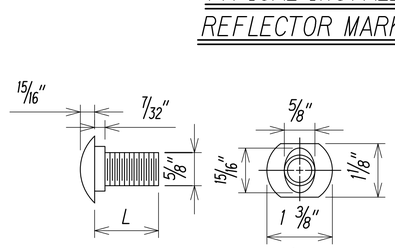
ELEVATION

STRONG POST THRIE-BEAM GUARDRAIL (SGR09a)

TRANSITION SECTION*

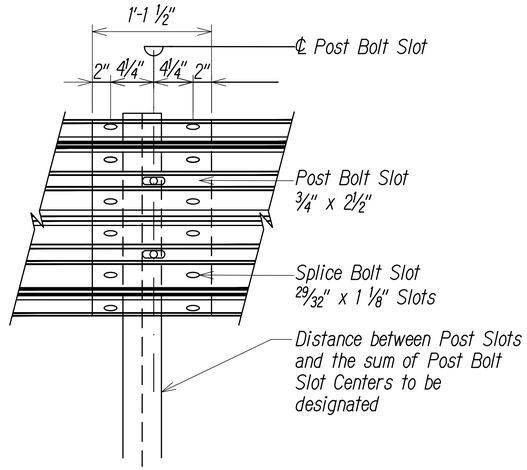


TYPICAL INSTALLATION OF REFLECTOR MARKER (RM-5)

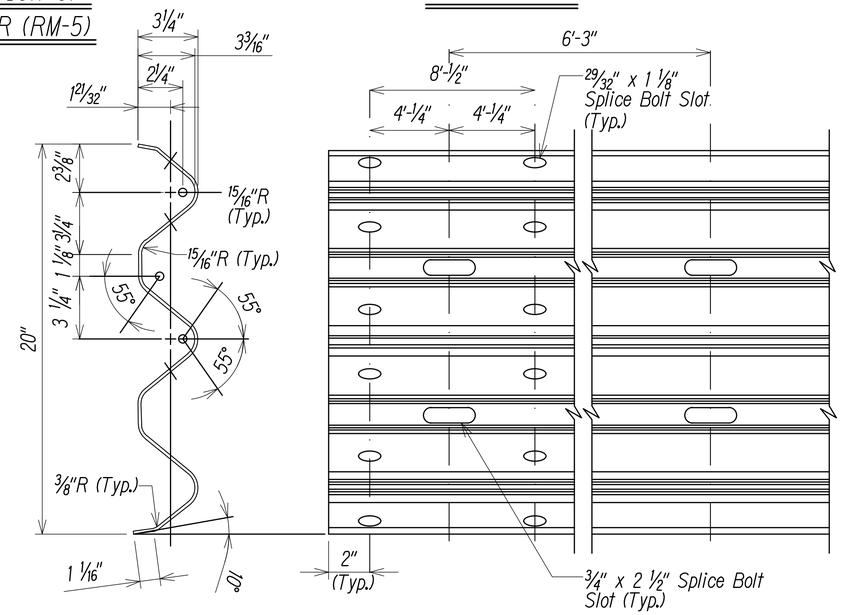


DESIGNATOR	L
FBB01	1 ⅜"
FBB02	2"
FBB03	10"

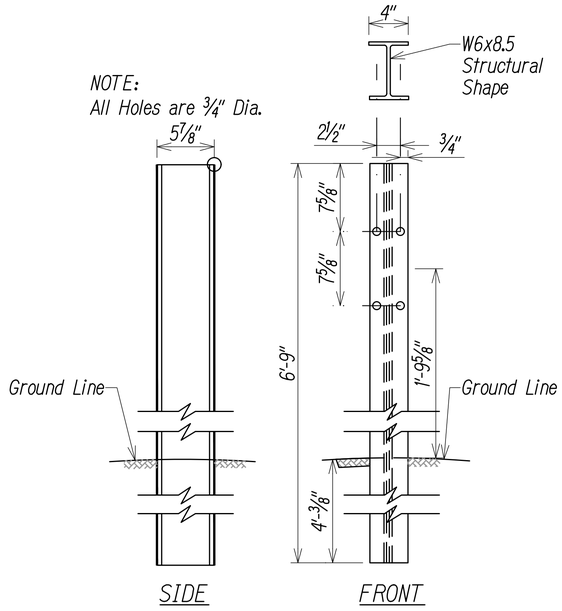
GUARDRAIL BOLTS AND RECESSED NUT



RAIL SPLICE



1 & 2 SPACE THRIE-BEAM GUARDRAIL (RTM02b)



THRIE-BEAM STRONG POST FOR PLASTIC SPACER BLOCKS PWE04

REDUCED PLAN
(HALF SIZE)
0 1 2 3
3 INCHES OF ORIGINAL PLAN

DATE	REVISION
⚠ 10/21/2022	Added plastic to callout

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRONG POST THRIE-BEAM GUARDRAIL

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS (Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

Scale: As Noted Date: August 2022

CHRISTOPHER R. H. BALL
LICENSED PROFESSIONAL ENGINEER
No. 12144-C
HAWAII, U.S.A.

This work was prepared by me or under my supervision

Chris Ball 4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

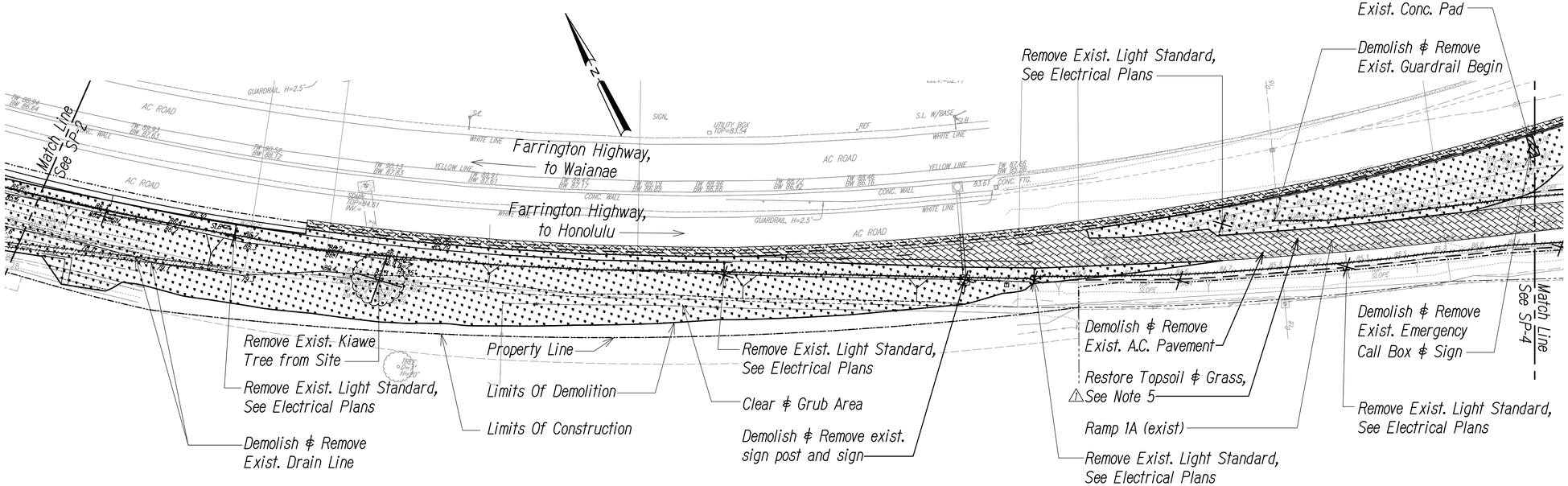
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

ORIGINAL PLAN
NOTE BOOK
No.

SHEET No. **R-20** OF **167** SHEETS

ADD. 56

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-HI-1(271)	2022	ADD. 61	167



DEMOLITION PLAN 3

Scale: 1" = 40'

Legend

- Limits of Construction
- Limits of Demolition
- Guardrail
- Property Limit
- Demolish & Remove Exist. Guardrail
- Demolish & Remove Exist. A.C. Pavement
- Clear & Grub
- Demolish & Remove Exist. Sign
- Demolish & Remove Exist. Tree

Notes:

1. For Demolition of Electrical Utilities, See Electrical Plans.
2. The Demolition of Trees Shall Coincide with all Other Demolition Work.
3. For Demolition of Signage, See P-1 to P-4
4. Demolition of Off-Ramp 1A shall commence after completion and opening of Off-Ramp SA
5. ⚠ Topsoil and grass cost shall be incidental to Excavation and Embankment. Topsoil thickness shall be 4".

Graphic Scale

1" = 40' 40' 20' 0 40' 80'

⚠	10/21/2022	Added note 5
	DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PARTIAL DEMOLITION PLANS 2

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-HI-1(271)

Scale: As Noted Date: August 2022

CHRISTOPHER H. BALL
LICENSED PROFESSIONAL ENGINEER
No. 12144-C
HAWAII, U.S.A.

This work was prepared by me or under my supervision

Chris Ball 4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

SHEET No. SP-3 OF 167 SHEETS

ADD. 61

ORIGINAL PLAN
NOTE BOOK
No.
SURVEY PLOTTED BY DATE
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-HI-1(271)	2022	ADD. 62	167

Match Line
See SP-3

Notes:

1. For Demolition of Electrical Utilities, See Electrical Plans.
2. The Demolition of Trees Shall Coincide with all Other Demolition Work.
3. For Demolition of Signage, See P-1 to P-4.
4. Demolition of Off-Ramp 1A shall commence after completion and opening of Off-Ramp SA.
5. Topsoil and grass cost shall be incidental to Excavation and Embankment. Topsoil thickness shall be 4".

Demolish & Remove Exist. Sign, Typ.
Remove Exist. Light Standard, See Electrical Plans
Limits Of Demolition
Property Line
Demolish & Remove Exist. A.C. Pavement
Restore Topsoil & Grass, See Note 5
Ramp 1A (exist)
Demolish & Remove Exist. Sign, Typ.
Demolish & Remove Exist. Curb
Remove Exist. Light Standard, See Electrical Plans
Demolish & Remove Exist. Sign, Typ.
existing cleanouts to remain
Relocate Exist. Light Standard, See Electrical Plans
Clear & Grub Area
Demolish & Remove Exist. Guardrail End
Adjust Exist. Signal Light Box to Finished Grade, Add Traffic Rated Box & Cover, See Electrical Plans
Relocate Exist. Sign
Remove Exist. 4" Yellow Stripe
Demolish & Remove Exist. Curb, Sawcut Along New Conc. Pavement Edge
Demolish & Remove Exist. Curb
Sawcut Along Conc. Pavement
Clear & Grub Exist. Island, Exist. Cleanouts to Remain
Remove Exist. 8" White Stripe, Stop Bar, & Left Turn Arrow
Remove Exist. 4" Yellow Stripe
Demolish & Remove Exist. Guardrail End
Demolish & Remove Exist. Guardrail Begin
Relocate Exist. Sign
Demolish & Remove Exist. A.C. Pavement
Remove Exist. Light Standard, See Electrical Plans
exist. bridge abutment to remain
Demolish & Remove Exist. Guardrail End
Demolish & Remove Conc. Pavement, Sawcut Along Conc. Pavement Edge
Demolish & Remove Exist. Sign
Demolish & Remove Exist. Curb
Demolish & Remove Exist. Guardrail End
Demolish & Remove Exist. Guardrail End
Matchline, See Right
Matchline, See Left
Demolish & Remove Exist. Curb, Sawcut Along Conc. Pavement Edge
Demolish & Remove Exist. A.C. Pavement
Adjust Exist. Traffic Signal Light Box to Finished Grade, Add Traffic Rated Box & Cover, See Electrical Plans
Adjust Exist. Cleanout to Finished Grade
Remove Exist. 4" White Stripe
Demolish & Remove Exist. Guardrail Begin
Demolish & Remove Conc. Pavement, Sawcut Along New Conc. Pavement Edge
Demolish & Remove Exist. Guardrail End
Demolish & Remove Conc. Pavement, Sawcut Along Conc. Pavement Edge
Demolish & Remove Exist. Sign
Demolish & Remove Exist. Curb
Demolish & Remove Exist. Guardrail End
Clear & Grub Area
Ramp C (exist)
Interstate Route H-1, to Waianae
Interstate Route H-1, to Honolulu
exist. Ramp 1B
Kalaeloa Boulevard
DO NOT ENTER
ELEV. 77.76

Legend

- Limits of Construction
- Limits of Demolition
- Guardrail
- Property Line
- Demolish & Remove Exist. Guardrail
- Demolish & Remove Pavement Markings
- Demolish & Remove Exist. A.C. Pavement
- Demolish & Remove Exist. Conc. Pavement
- Clear & Grub
- Demolish & Remove Exist. Sign
- Demolish & Remove Exist. Tree

DEMOLITION PLAN 4

Scale: 1" = 40'

Graphic Scale

1" = 40' 40' 20' 0 40' 80'

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
NOTE BOOK	TRACED BY	
No.	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

⚠	10/21/2022	Added note 5
	DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PARTIAL DEMOLITION PLANS 3

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-HI-1(271)

Scale: As Noted Date: August 2022

CHRISTOPHER H. BALL
LICENSED PROFESSIONAL ENGINEER
No. 12144-C
HAWAII, U.S.A.

This work was prepared by me or under my supervision

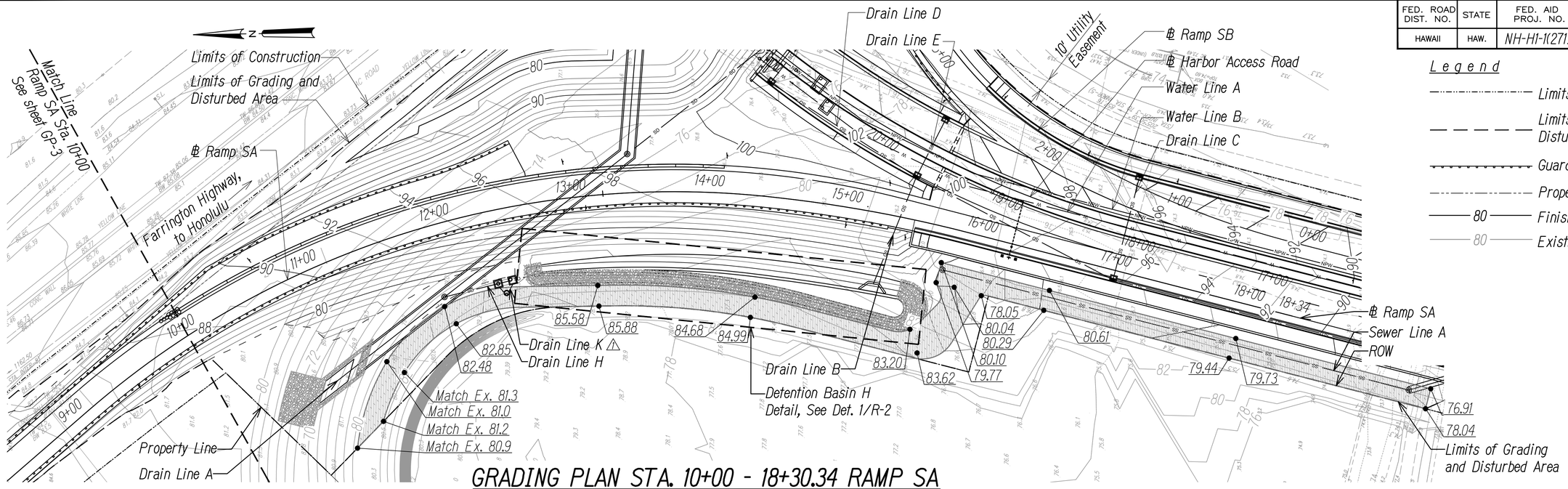
4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

SHEET No. SP-4 OF 167 SHEETS

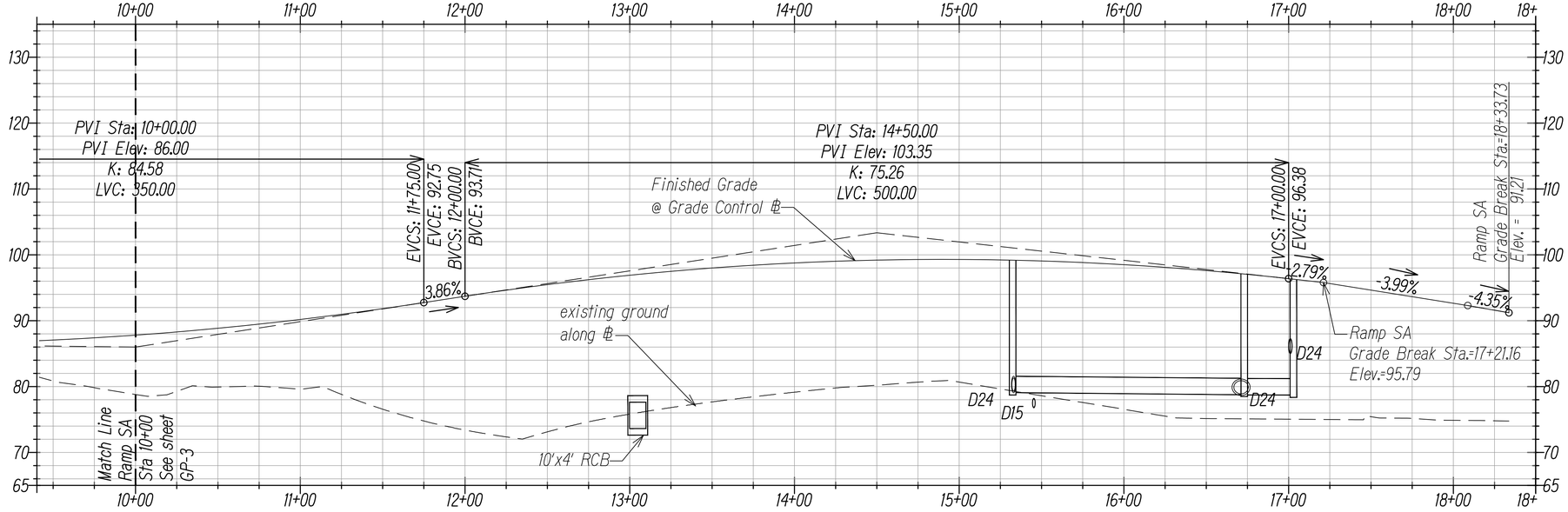
ADD. 62

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-HI-1(271)	2022	ADD. 73	167



GRADING PLAN STA. 10+00 - 18+30.34 RAMP SA

Scale: 1" = 40'



GRADING PROFILE STA. 10+00 - 18+30.34 RAMP SA

Scale: Horiz. 1" = 40'
Vert. 1" = 10'

Graphic Scale

1" = 40' 40' 20' 0 40' 80'

1" = 10' 10' 5' 0 10' 20'

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
	TRACED BY	
	DESIGNED BY	
	QUANTITIES BY	
No.	CHECKED BY	

DATE	REVISION
⚠ 10/21/2022	Revised DL K

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GRADING PLAN 3

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-HI-1(271)

Scale: As Noted Date: August 2022

CHRISTOPHER R. BALL LICENSED PROFESSIONAL ENGINEER No. 12144-C HAWAII, U.S.A.

This work was prepared by me or under my supervision

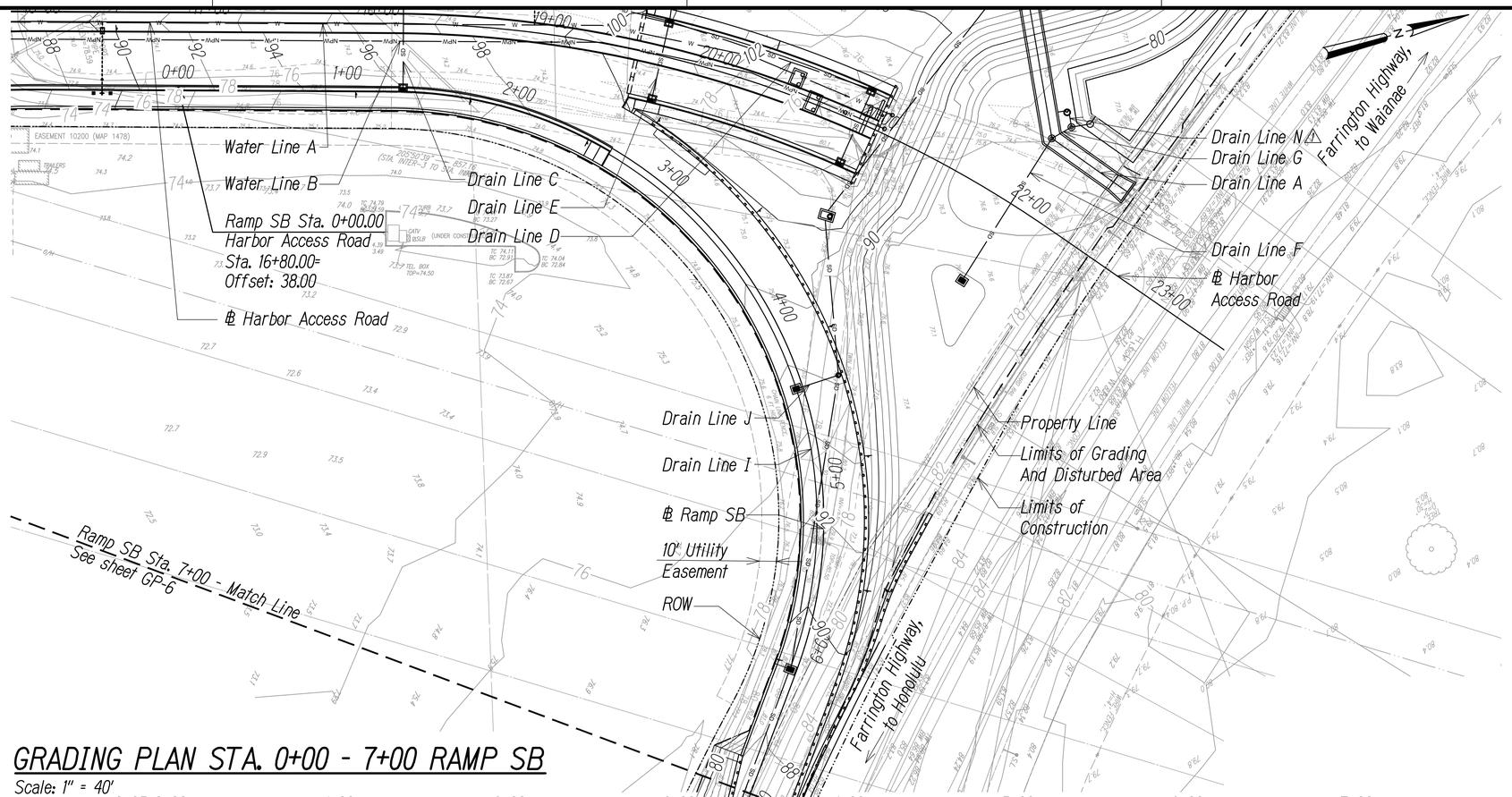
4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

SHEET No. GP-4 OF 167 SHEETS

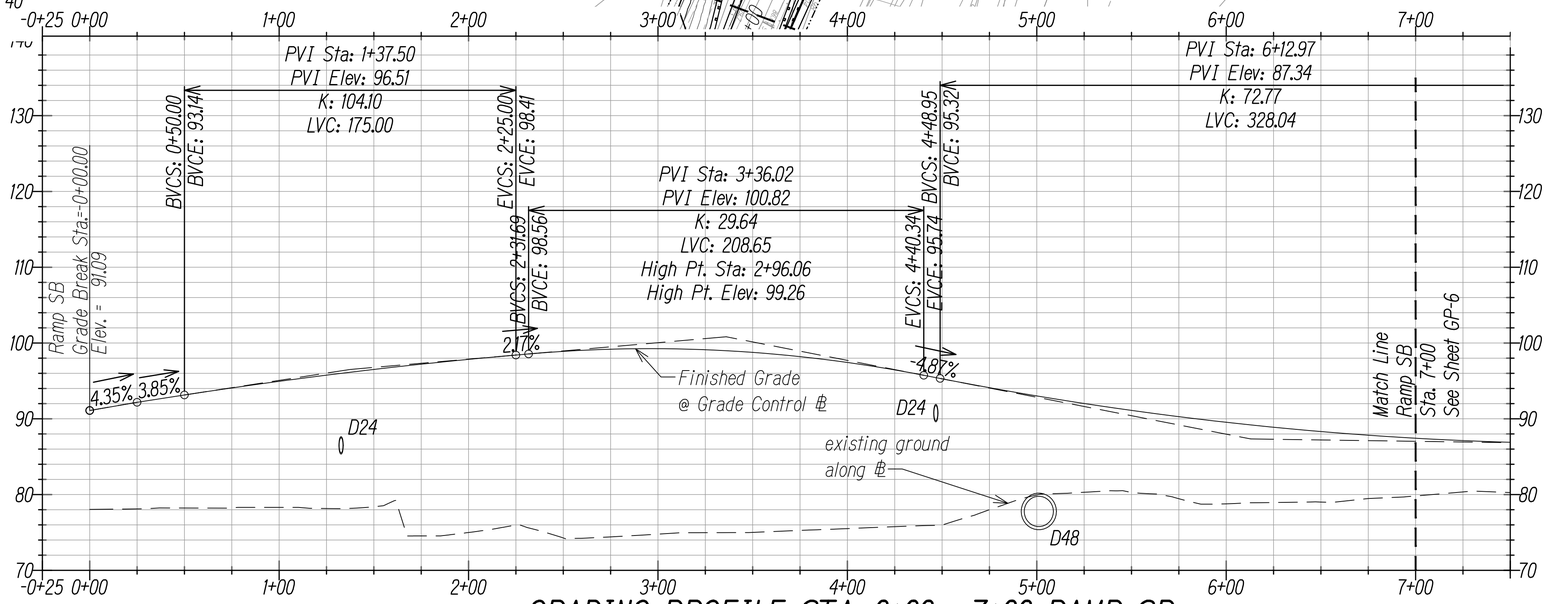
ADD. 73

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 74	167



GRADING PLAN STA. 0+00 - 7+00 RAMP SB

Scale: 1" = 40'



GRADING PROFILE STA. 0+00 - 7+00 RAMP SB

Scale: Horiz. 1" = 40'
Vert. 1" = 10'

Legend

- Limits of Construction
- Limits of Grading and Disturbed Area
- Guardrail
- Property Line
- 80 Finish Grade Contour
- 80 Exist. Grade Contour

Graphic Scale

1" = 40' 40' 20' 0 40' 80'

1" = 10' 10' 5' 0 10' 20'

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
NOTE BOOK	TRACED BY	
	DESIGNED BY	
	QUANTITIES BY	
No.	CHECKED BY	

⚠	DATE	REVISION
⚠	10/21/2022	Added DL N

CHRISTOPHER R. H. BALL
LICENSED PROFESSIONAL ENGINEER
No. 12144-C
HAWAII, U.S.A.

This work was prepared by me or under my supervision

4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GRADING PLAN 4

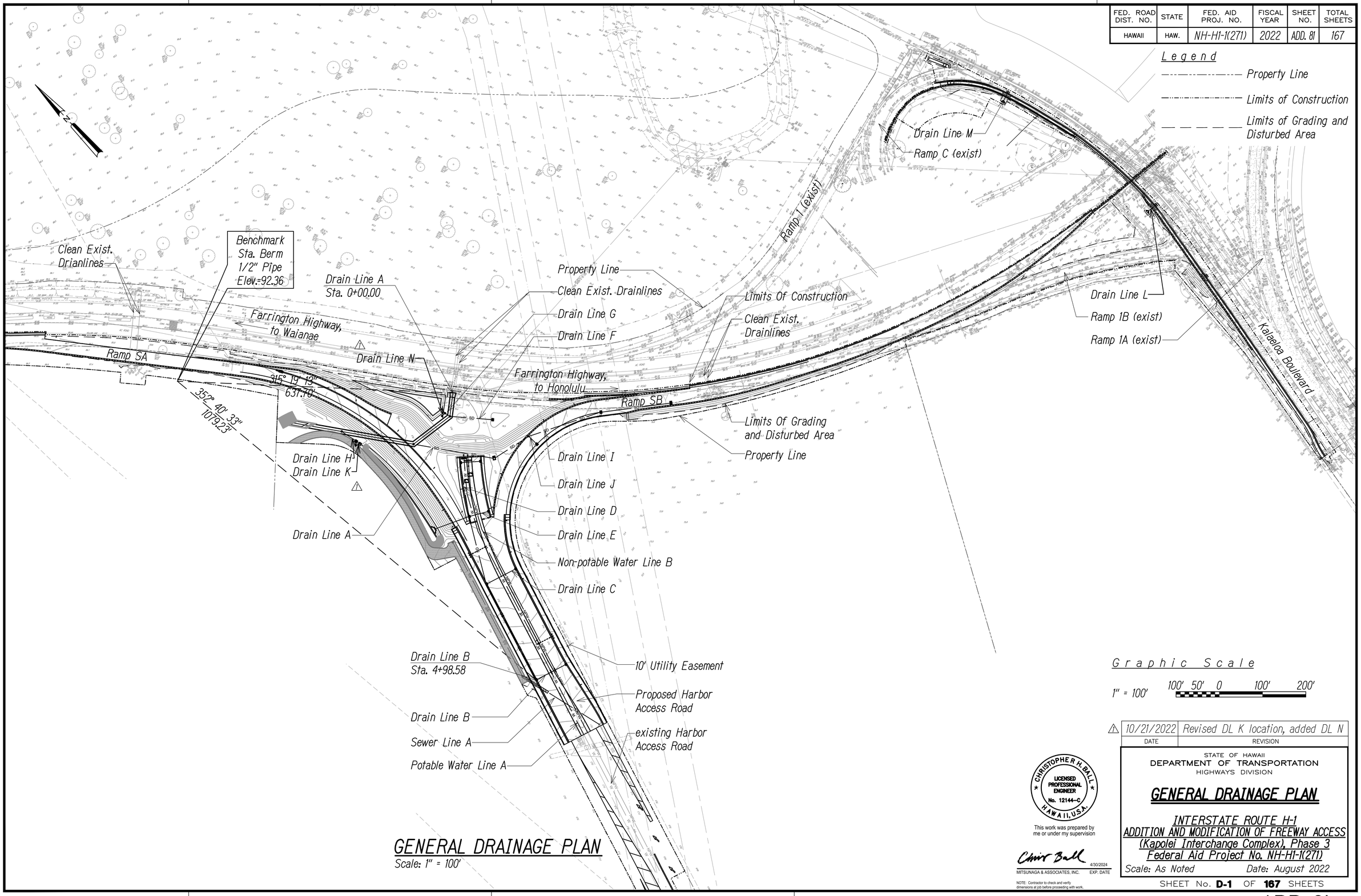
INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

Scale: As Noted Date: August 2022

SHEET No. **GP-5** OF **167** SHEETS

ADD. 74

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-HI-1(271)	2022	ADD. 81	167



GENERAL DRAINAGE PLAN

Scale: 1" = 100'

Graphic Scale

1" = 100' 100' 50' 0 100' 200'

⚠	10/21/2022	Revised DL K location, added DL N
	DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GENERAL DRAINAGE PLAN

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-HI-1(271)

Scale: As Noted Date: August 2022

CHRISTOPHER H. BALL
LICENSED PROFESSIONAL ENGINEER
No. 12144-C
HAWAII, U.S.A.

This work was prepared by me or under my supervision

Chris Ball 4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

SHEET No. D-1 OF 167 SHEETS

ADD. 81

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
NOTE BOOK	TRACED BY	
	DESIGNED BY	
	QUANTITIES BY	
No.	CHECKED BY	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 82	167

(01) Drain Line B Sta. 4+94.75=
Harbor Access Road Sta. 15+64.11
Offset: 39.53' Lt.
Type "1A-9P" DI B-3,
See Det. 1/S-13
Top=85.50
Inv.=80.30 (D24)

(03) Drain Line B Sta. 2+45.11=
Drain Line C Sta. 0+00.00=
Harbor Access Road Sta. 18+12.43
Offset: 39.02' Lt.
Type "1A-9P" DI B-2,
See Det. 1/S-13
Top=96.22
Inv.=79.05 (D24)
Inv.=85.11 (D24)

(05) Drain Line B Sta. 0+83.79=
Drain Line D Sta. 0+00.00=
Drain Line E Sta. 0+00.00=
Harbor Access Road Sta. 19+66.37
Offset: 21.00' Lt.
Type "1A-9P" DI B-1, See Det. 1/S-13
Top=100.58
Inv.=78.24 (D24)
Inv.=91.92 (D24)

(02) Drain Line B Sta. 5+73.90
Harbor Access Road Sta. 15+61.94
Offset 39.58' Rt.
Type "1A-9P" DI B-4,
See Det. 1/S-13
Top=85.39
Inv.=80.69 (D24)

(04) Drain Line C Sta. 0+78.05
Harbor Access Road Sta. 18+12.99
Offset 39.04' Rt.
Type "1A-9P" DI C-1,
See Det. 1/S-13
Top=95.96
Inv.=85.50 (D24)

(06) Drain Line E Sta. 0+48.01=
Harbor Access Road Sta. 19+66.96
Offset: 27.01' Lt.
Type "1A-9P" DI E-1,
See Det. 1/S-13
Top=100.48
Inv.=92.16 (D24)

(07) Drain Line D Sta. 1+26.19=
Harbor Access Road Sta. 20+88.98
Offset: 21.00' Lt.
Type "1A-9P" DI D-1,
See Det. 1/S-13
Top=103.73
Inv.=93.18 (D24)

⚠(10) Drain Line B Sta. 0+00.00=
Ramp SA Sta. 15+29.87
Offset: 51.53' Lt.
Headwall B-1, See DOT Std. Plans H-20
Top=80.80
Inv.=77.69 (D24)

⚠(11) Drain Line H Sta. 0+68.96
Ramp SA Sta. 12+65.05
Offset 51.37' Rt.
Type "C" Riser H-1, See Det. 1/S-15
Top=80.34
Inv.=78.00 (D24)
Inv.=78.00 (D12)

Ramp SA Sta. 18+33.73=
Harbor Access Road Sta. 16+80.00
Offset: 32.00' Lt.

℄ Harbor Access Road

ROW Property Line
10' Utility Easement
Ramp SB Sta. 0+00.00=
Harbor Access Road Sta. 16+80.00
Offset: 38.00' Rt.

(08) Drain Line D Sta. 1+74.19
Harbor Access Road Sta. 20+88.98
Offset 27.00' Rt.
Type "1A-9P" DI D-2,
See Det. 1/S-13
Top=103.61
Inv.=93.66 (D24)

⚠(09) Drain Line I Sta. 1+89.47
Harbor Access Road Sta. 20+93.55
Offset 57.96' Rt.
Type Modified I-1 Manhole,
See Det. 1/S-12
Top=100.86
Inv.=75.00 (D48)
Inv.=75.00 (D48)

⚠(12) Drain Line H Sta. 0+50.50=
Drain Line K Sta. 0+22.60=
Ramp SA Sta. 12+45.04
Offset: 52.63' Lt.
Type "C" DMH H-2, See Det. 1/S-15
Top=82.72
Inv.=77.82 (D12)
Inv.=77.63 (D24)
Inv.=78.13 (D24)

⚠(13) Drain Line K Sta. 0+10.67
Ramp SA Sta. 12+38.29
Offset 62.86' Rt.
4' Hydrodynamic Separator K,
See Det. R-8
Top=85.00
Inv.=76.76 (D12)
Inv.=77.76 (D12)

Limits of Grading and Disturbed Area
Limits of Construction
Drain Line B
Drain Line C

⚠(14) Drain Line H Sta. 0+40.21=
Drain Line K Sta. 0+00.00=
Ramp SA Sta. 12+33.83
Offset 52.99' Rt.
Type "C" DMH H-1, See Det. 1/S-15
Top=82.90
Inv.=77.43 (D24)
Inv.=77.43 (D24)
Inv.=77.43 (D12)

⚠(15) Drain Line A Sta. 1+12.34=
Drain Line H Sta. 0+00.00=
Ramp SA Sta. 11+90.06
Offset 52.68' Rt.
Type "C" SDMH A-1, See Det. 1/S-14
Top=80.76
Inv.=72.36 (D24 ⋕ 10'x4' RCB)

⚠(20) Drain Line F Sta. 0+99.25=
Ramp SB Sta. 4+25.18
Offset: 110.03' Lt.
Type "1A-9P" DI F-1,
See Det. 1/S-13
Top=81.50
Inv.=75.60 (D24)

⚠(21) Drain Line J Sta. 0+26.07
Ramp SB Sta. 4+46.69
Offset 4.00' Rt.
Type "61614P" DI J-1,
See DOT Std. Plans H-12
Add Drain Inlet Filter,
See Det. 1/S-11 Section "A-A"
Top=95.28
Inv.=89.79 (D24)

(22) Drain Line I Sta. 2+84.45=
Drain Line J Sta. 0+00.00=
Ramp SB Sta. 4+46.69
Offset: 22.07' Lt.
Type Modified I-2 Manhole,
See Det. 2/S-11
Top=96.24
Inv.=75.47 (D48)
Inv.=89.53 (D24)

⚠(25) Drain Line N Sta. 0+06.50=
Ramp SA Sta. 13+40.89
Offset: 120.20' Lt.
4' Hydrodynamic Separator N,
See Det. R-8
Top=80.44
Inv.=75.20 (D12)
Inv.=74.20 (D12)

⚠(26) Drain Line N Sta. 0+00.00
Ramp SA Sta. 13+46.34
Offset 119.39' Lt.
Conn. to 10'x4' RCB,
See Det. 4/R-8
Top=80.71
Inv.=75.17 (D12)
Inv.=74.95 (10'x4' RCB)

⚠(16) Drain Line A Sta. 0+00.00= ⚠
Ramp SA Sta. 10+69.44
Offset: 84.67' Lt.
Headwall A-1, See Det. 1/S-9
Top=71.20
Inv.=71.24 (D48)

⚠(17) Drain Line A Sta. 2+80.93
Ramp SA Sta. 13+41.46
Offset 28.22' Lt.
Type "C" SDMH A-2,
See Det. 1/S-14
Top=98.43
Inv.=74.05 (D48⋕10'x4' RCB)

Drain Line A Sta. 3+86.75=
Drain Line F Sta. 0+00.00
Drain Line G Sta. 0+00.00
Ramp SA Sta. 13+52.76
Offset: 133.29' Lt.
Type "C" SDMH A-3
See Det. 2/S-14
Top=81.11
Inv.=75.11 (10'x4' RCB ⋕ D24)

CRM Headwall, See Det. Sht. R-5

Property Line
Drain Line A
Drain Line H
⚠ Drain Line K
℄ Ramp SA
Drain Line E
Drain Line D
Drain Line I
Drain Line J
Drain ⚠ Line N
Drain Line G
Clean Exist. Drain Lines
℄ Ramp SB
Drain Line F

(19) Drain Line A Sta. 4+41.29= ⚠
Ramp SA Sta. 13+25.99
Offset: 176.61' Lt.
Headwall A-2
See Det. S-10
Top=81.74
Inv.=75.65 (10'x4' RCB)
Inv.=76.65 ((3) D30)

(23) Drain Line G Sta. 0+13.32= ⚠
Drain Line N Sta. 0+00.00=
Ramp SA Sta. 13+41.98
Offset 130.20' Lt.
SDMH G-1
See DOT Std. Det H-04
Top=80.51
Inv.=75.25 (D24)

(24) Drain Line G Sta. 0+24.50= ⚠
Ramp SA Sta. 13+32.77
Offset: 131.71' Lt.
Riser G-1, See Det. 2/R-9
Top=78.00
Inv.=75.31 (D24⋕D12)

Legend
- Limits of Construction
- Limits of Grading and Disturbed Area
- Guardrail
- Property Line
- 80 Finish Grade Contour
- 80 Exist. Grade Contour

Match Line
See sheet D-3

Note:
1. For 6" Underdrains along Harbor Access Road, see D-5 - DRAINAGE PLAN 4.

DRAINAGE PLAN 1
Scale: 1" = 40'

Graphic Scale
1" = 40'
40' 20' 0 40' 80'

⚠	10/21/2022	Revised DL K, added DL N, revised Drain Line callouts
	DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PLAN 1

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

Scale: As Noted Date: August 2022

CHRISTOPHER R. H. BALL
LICENSED PROFESSIONAL ENGINEER
No. 12144-C
HAWAII, U.S.A.

This work was prepared by me or under my supervision

Chris Ball 4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE
ORIGINAL PLAN
NOTE BOOK
No.

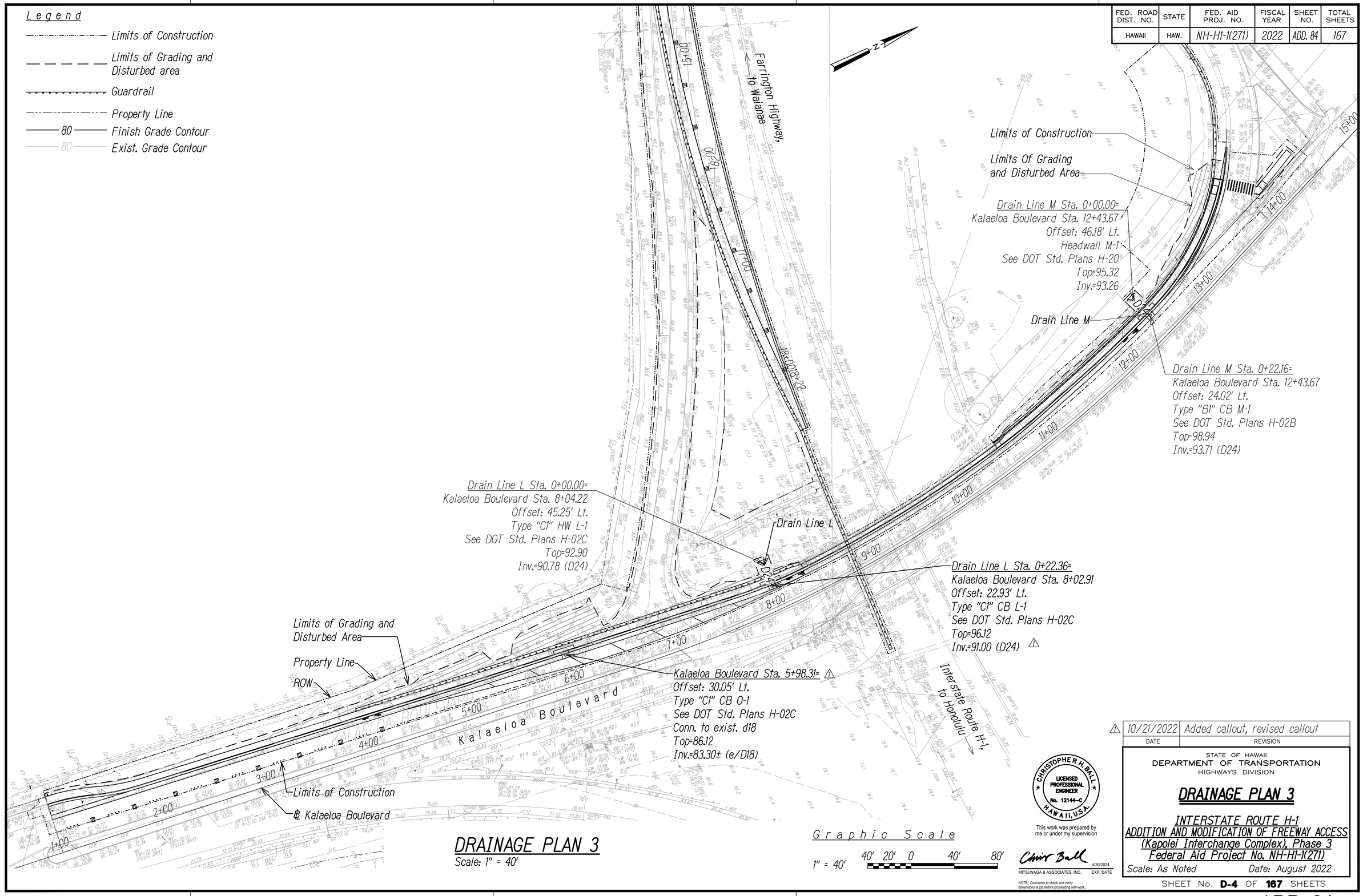
SHEET No. D-2 OF 167 SHEETS

ADD. 82

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 84	167

Legend

- Limits of Construction
- Limits of Grading and Disturbed area
- Guardrail
- Property Line
- 80 Finish Grade Contour
- 80 Exist. Grade Contour



DRAINAGE PLAN 3

Scale: 1" = 40'

Graphic Scale

1" = 40' 40' 20' 0 40' 80'

SURVEY PLOTTED BY	DATE
DRAWN BY	
TRACED BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	

CHRISTOPHER H. BALL
LICENSED PROFESSIONAL ENGINEER
No. 12144-C
HAWAII, U.S.A.

This work was prepared by me or under my supervision

Chris Ball 4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

⚠	10/21/2022	Added callout, revised callout
	DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PLAN 3

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

Scale: As Noted Date: August 2022

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 85	167

(01) ℄ Harbor Access Road
Sta. 13+99.99
Offset: 45.00' Lt.
Type "A" C.O.
Conn. to exist. 6" underdrain
Inv.=73.87 (D6)

(02) ℄ Harbor Access Road
Sta. 14+59.78
Offset: 42.01' Lt.
Type "A" C.O.
Inv.=76.48 (D6)

(03) ℄ Harbor Access Road
Sta. 14+61.78
Offset: 42.01' Lt.
1-6" 1/4 Bend
Type "B" C.O.
Inv.=76.57 (D6)

(04) ℄ Harbor Access Road
Sta. 15+64.07
Offset: 38.00' Lt.
Conn. to Drain Inlet
See HDOT Std. Plan H-20
Inv.=81.69 (D6)

(05) ℄ Harbor Access Road
Sta. 18+12.44
Offset: 37.82' Lt.
Conn. to Drain Inlet
See HDOT Std. Plan H-20
Inv.=92.41 (D6)

(06) ℄ Harbor Access Road
Sta. 19+51.36
Offset: 54.13' Lt.
Type "A" C.O.
Inv.=95.12 (D6)

(07) ℄ Harbor Access Road
Sta. 14+62.16
Offset: 56.02' Lt.
Weephole
Inv.=76.43 (D6)

(08) ℄ Harbor Access Road
Sta. 13+99.99
Offset: 43.25' Rt.
Type "A" C.O.
Conn. to exist. 6" underdrain⚠
Inv.=73.90 (D6)

(09) ℄ Harbor Access Road
Sta. 14+56.14
Offset: 40.47' Rt.
Type "A" C.O.
Inv.=76.34 (D6)

(10) ℄ Harbor Access Road
Sta. 14+58.09
Offset: 40.42' Rt.
1-6" 1/4 Bend
Type "B" C.O.
Inv.=76.43 (D6)

(11) ℄ Harbor Access Road
Sta. 15+62.00
Offset: 37.35' Rt.
Conn. to Drain Inlet
See HDOT Std. Plan H-20
Inv.=81.59 (D6)

(12) ℄ Harbor Access Road
Sta. 18+12.97
Offset: 36.81' Rt.
Conn. to Drain Inlet
See HDOT Std. Plan H-20
Inv.=92.21 (D6)

(13) ℄ Harbor Access Road
Sta. 18+57.71
Offset: 38.65' Rt.
1-6" 1/32 Bend
Type "B" C.O.
Inv.=93.44 (D6)

(14) ℄ Harbor Access Road
Sta. 19+08.83
Offset: 47.75' Rt.
1-6" 1/32 Bend
Type "B" C.O.
Inv.=94.59 (D6)

(15) ℄ Harbor Access Road
Sta. 19+49.84
Offset: 58.99' Rt.
Type "A" C.O.
Inv.=95.26 (D6)

(16) ℄ Ramp SB Sta. 2+62.64
Offset: 4.00' Rt.
Type "A" C.O.
Inv.=95.70 (D6)

(17) ℄ Ramp SB Sta. 3+19.18
Offset: 0.69' Lt.
1-6" 1/16 Bend
Type "B" C.O.
Inv.=95.36 (D6)

(18) ℄ Ramp SB Sta. 3+90.91
Offset: 2.65' Rt.
1-6" 1/16 Bend
Type "B" C.O.
Inv.=93.80 (D6)

(19) ℄ Ramp SB Sta. 4+46.69
Offset: 4.00' Rt.
Conn. to Drain Inlet
See HDOT Std. Plan H-20
Inv.=91.44 (D6)

(20) ℄ Ramp SB Sta. 5+00.00
Offset: 3.17' Rt.
1-6" 1/32 Bend
Type "B" C.O.
Inv.=89.06 (D6)

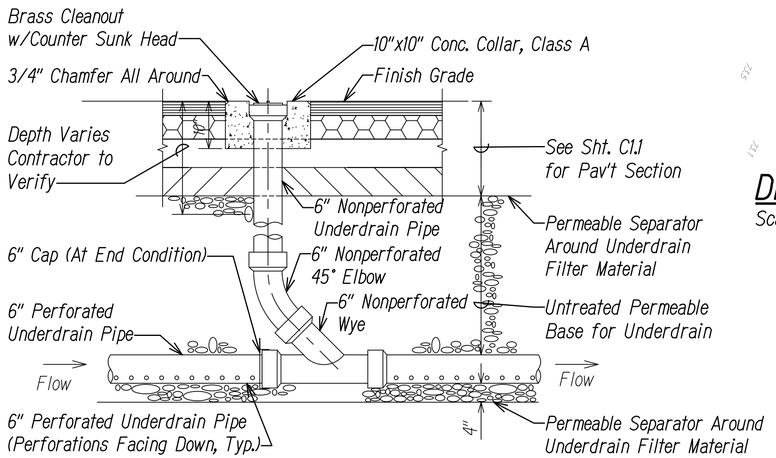
(21) ℄ Ramp SB Sta. 5+62.06
Offset: 0.45' Lt.
1-6" 1/16 Bend
Type "B" C.O.
Inv.=86.88 (D6)

(22) ℄ Ramp SB Sta. 6+17.98
Offset: 4.00' Rt.
Conn. to Drain Inlet
See HDOT Std. Plan H-20
Inv.=85.07 (D6)

℄ Harbor Access Road
℄ Ramp SA ⚠
℄ Ramp SB
Limits of Construction
Limits of Grading and Disturbed Area
Sewer Access Road
6" Underdrain, See Det. 1/T-13
Drain Line B
Drain Line C
Drain Line D
Drain Line E
Drain Line I
Drain Line J
10' Utility Easement
Property Line
ROW
EASEMENT 10200 (MAP 1478)

DRAINAGE PLAN 1
Scale: 1" = 40'

Legend
- Limits of Construction
- Limits of Grading and Disturbed Area
- Guardrail
- Property Line
- 80 Finish Grade Contour
- 80 Exist. Grade Contour



RISER SECTION
Not To Scale

UNDERDRAIN CLEANOUT TYPE "B"
Not To Scale

UNDERDRAIN CLEANOUT TYPE "A"
Not To Scale

Graphic Scale
1" = 40'
40' 20' 0 40' 80'

⚠	10/21/2022	Revised callout, deleted DL K callout
	DATE	REVISION

CHRISTOPHER H. BALL * LICENSED PROFESSIONAL ENGINEER No. 12144-C * HAWAII, U.S.A.
This work was prepared by me or under my supervision
Chris Ball 4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PLAN 4

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-HI-1(271)

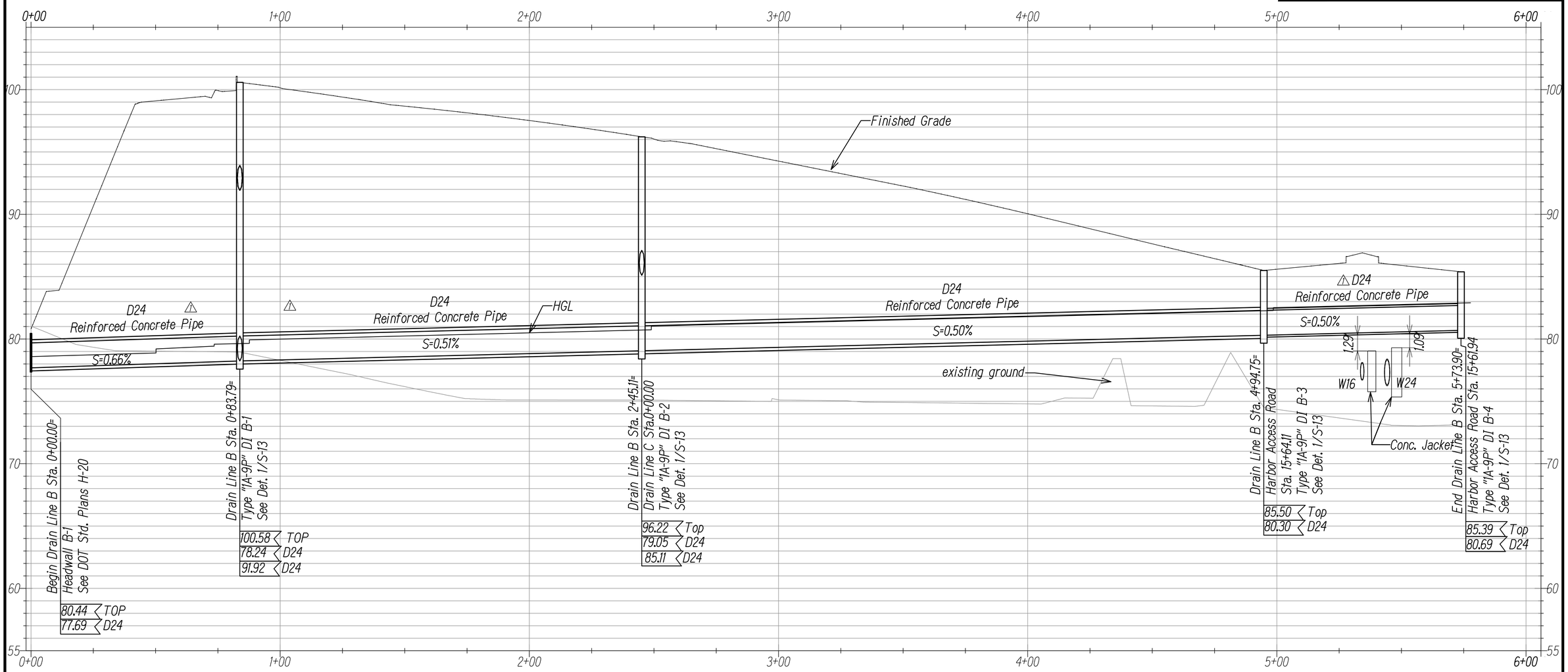
Scale: As Noted Date: August 2022

SHEET No. D-5 OF 167 SHEETS

ADD. 85

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
	TRACED BY	
	DESIGNED BY	
	QUANTITIES BY	
No.	CHECKED BY	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 87	167



DRAIN LINE B PROFILE

Scale: Horiz: 1" = 20'
Vert: 1" = 4'

SURVEY PLOTTED BY	DATE
DRAWN BY	
TRACED BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	

ORIGINAL PLAN
NOTE BOOK
No.

Graphic Scale

1" = 20' 20' 10' 0 20' 40'

1" = 4' 4' 2' 0 4' 8'

Approved:

Manager and Chief Engineer, BWS Date
(For Work Affecting BWS Facilities
in City/State R/W and BWS Easement Only)

⚠	DATE	REVISION
	10/21/2022	Removed DL K, revised pipe material

CHRISTOPHER H. BALL
LICENSED PROFESSIONAL ENGINEER
No. 12144-C
HAWAII, U.S.A.

This work was prepared by me or under my supervision

Chris Ball 4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PROFILES 2

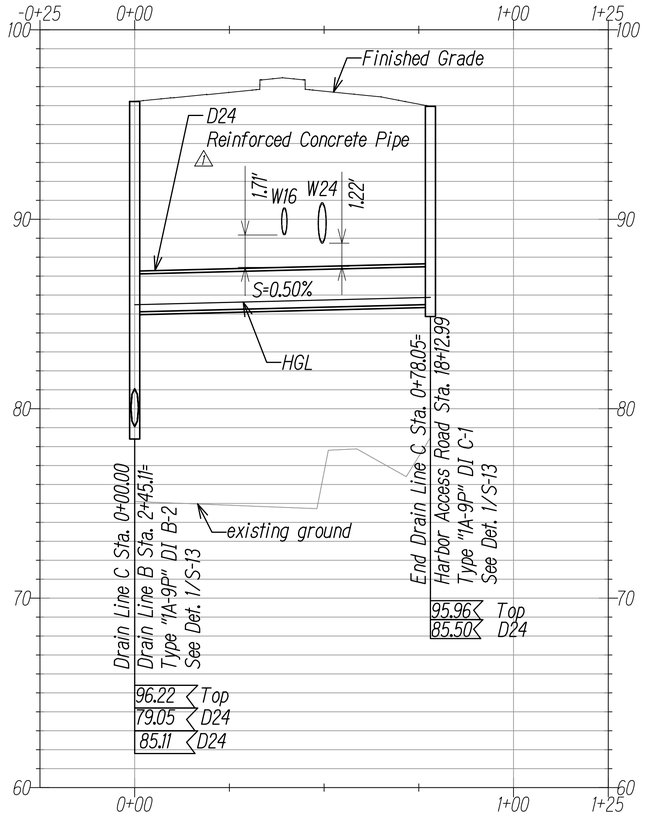
INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

Scale: As Noted Date: August 2022

SHEET No. **D-7** OF **167** SHEETS

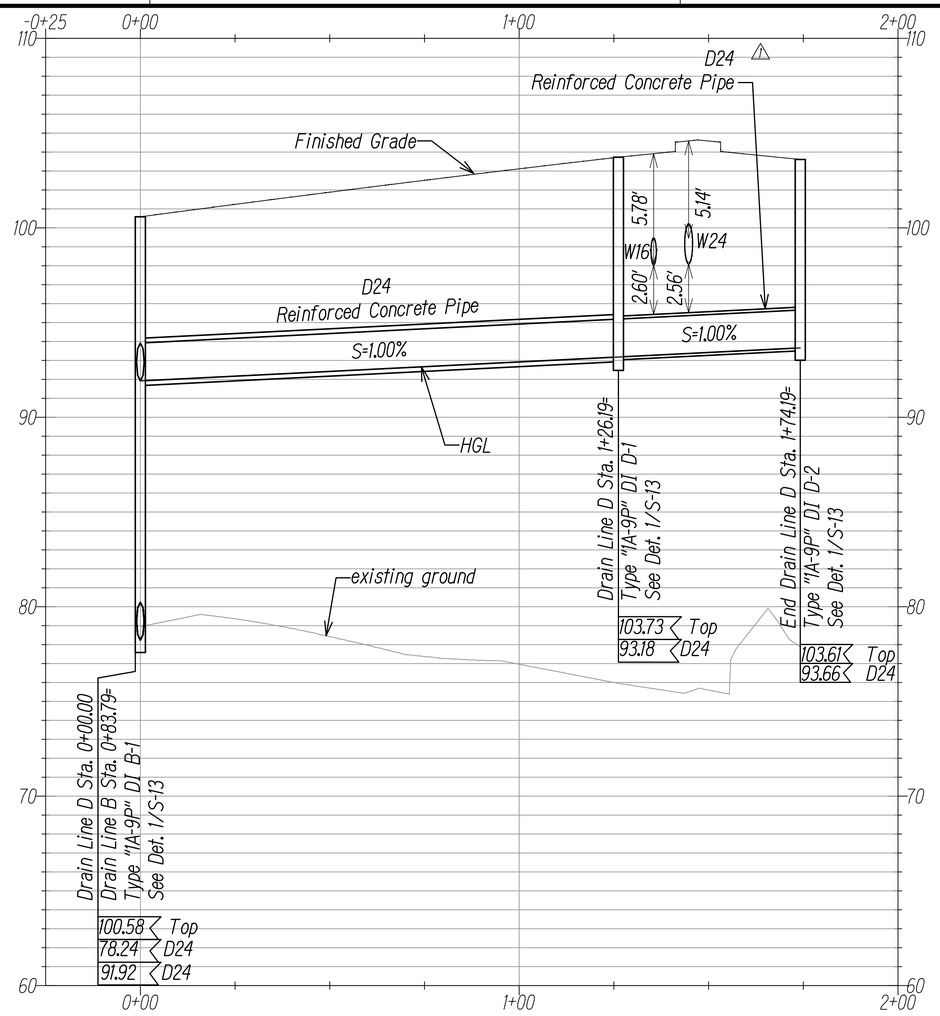
ADD. 87

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 88	167



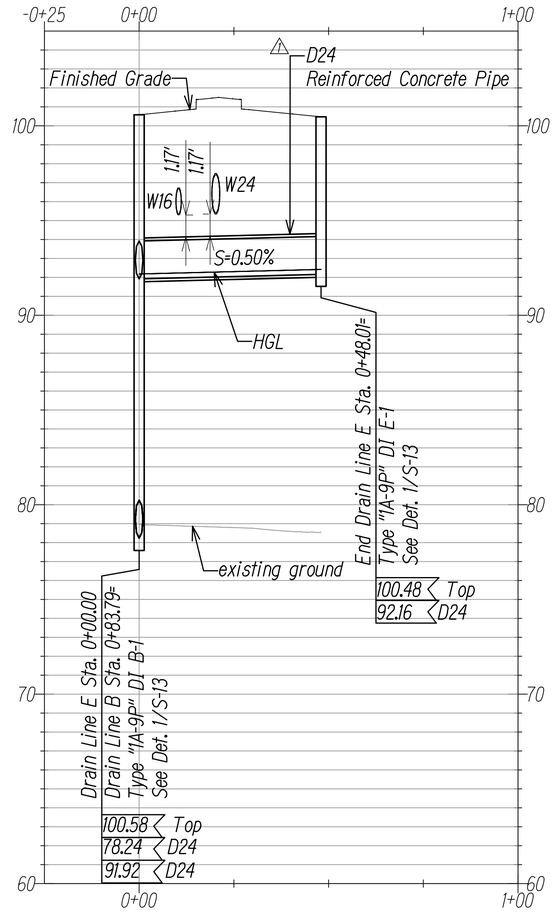
DRAIN LINE C PROFILE

Scale: Horiz: 1" = 20'
Vert: 1" = 4'



DRAIN LINE D PROFILE

Scale: Horiz: 1" = 20'
Vert: 1" = 4'



DRAIN LINE E PROFILE

Scale: Horiz: 1" = 20'
Vert: 1" = 4'

SURVEY PLOTTED BY ____ DATE
DRAWN BY ____ "
TRACED BY ____ "
DESIGNED BY ____ "
QUANTITIES BY ____ "
CHECKED BY ____ "
ORIGINAL PLAN
NOTE BOOK
No. ____

Graphic Scale

1" = 20' 20' 10' 0 20' 40'

1" = 4' 4' 2' 0 4' 8'

Approved:

Manager and Chief Engineer, BWS Date
(For Work Affecting BWS Facilities
in City/State R/W and BWS Easement Only)

CHRISTOPHER H. BALL
LICENSED PROFESSIONAL ENGINEER
No. 12144-C
HAWAII, U.S.A.

This work was prepared by me or under my supervision

4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

⚠	10/21/2022	Revised pipe material
	DATE	REVISION

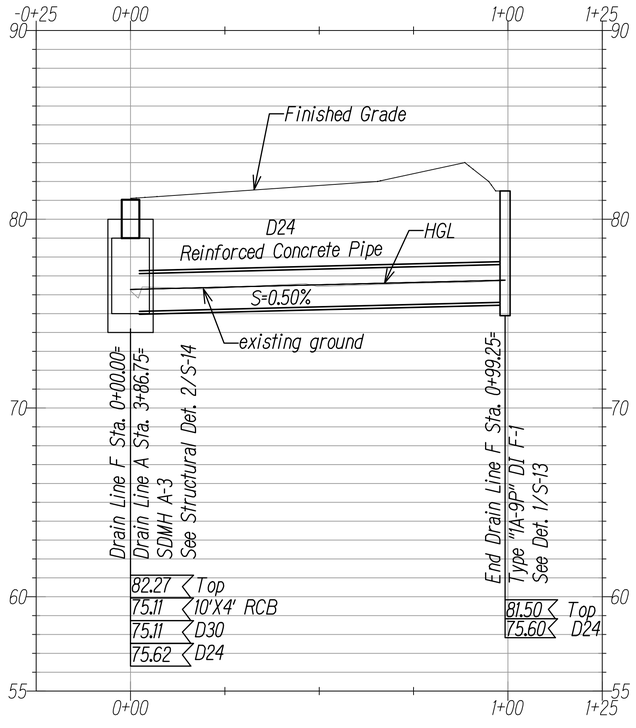
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PROFILES 3

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-HI-1(271)

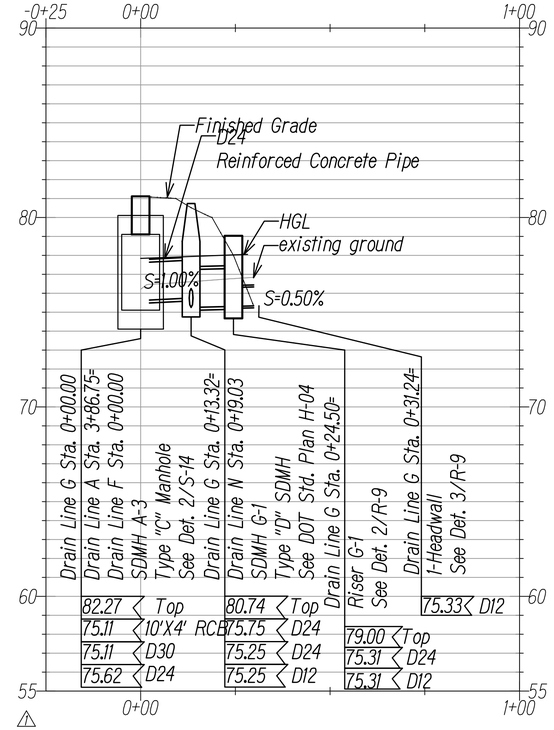
Scale: As Noted Date: August 2022

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 89	167



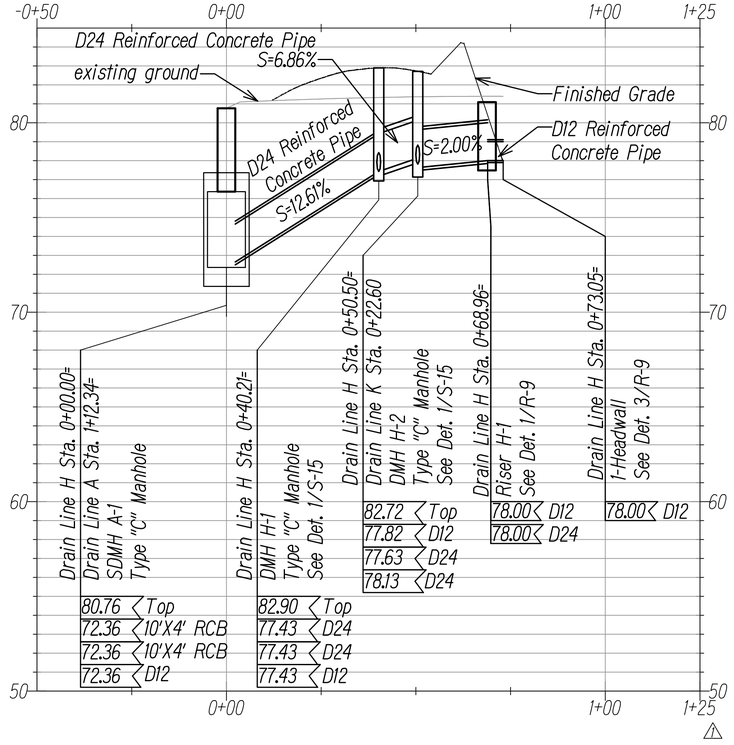
DRAIN LINE F PROFILE

Scale: Horiz: 1" = 20'
Vert: 1" = 4'



DRAIN LINE G PROFILE

Scale: Horiz: 1" = 20'
Vert: 1" = 4'



DRAIN LINE H PROFILE

Scale: Horiz: 1" = 20'
Vert: 1" = 4'

SURVEY PLOTTED BY ____ DATE
DRAWN BY ____
TRACED BY ____
DESIGNED BY ____
QUANTITIES BY ____
CHECKED BY ____

ORIGINAL PLAN
NOTE BOOK ____ No. ____

Graphic Scale

1" = 20' 20' 10' 0 20' 40'

1" = 4' 4' 2' 0 4' 8'

CHRISTOPHER R. H. BALL
LICENSED PROFESSIONAL ENGINEER
No. 12144-C
HAWAII, U.S.A.

This work was prepared by me or under my supervision

Chris Ball 4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

DATE	REVISION
⚠ 10/21/2022	Revised DL G, revised pipe material, added DL N

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PROFILES 4

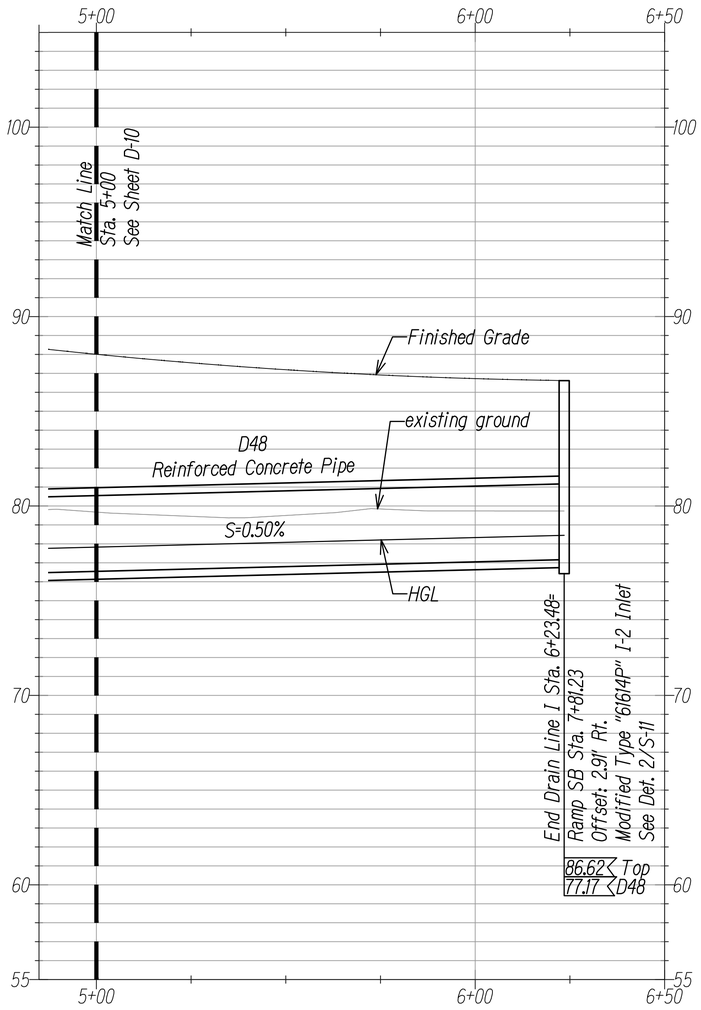
INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

Scale: As Noted Date: August 2022

SHEET No. **D-9** OF **167** SHEETS

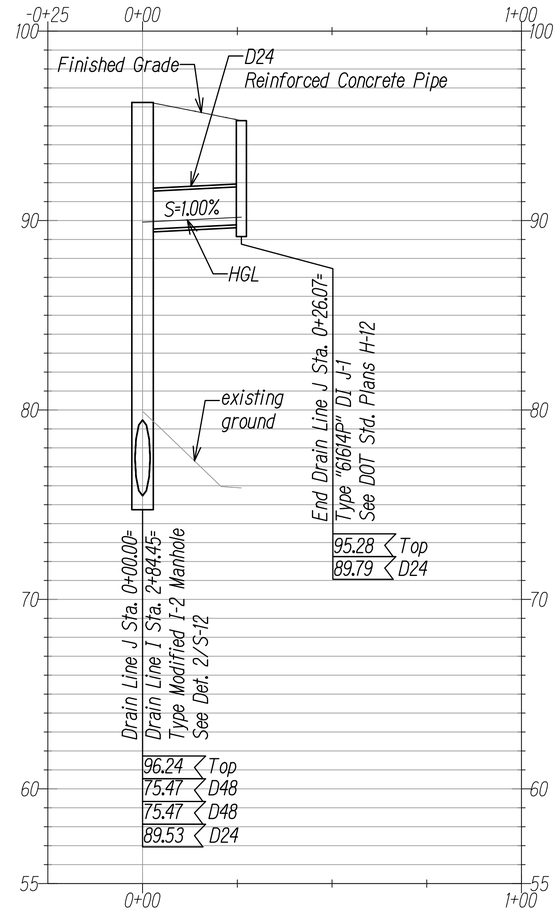
ADD. 89

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 91	167



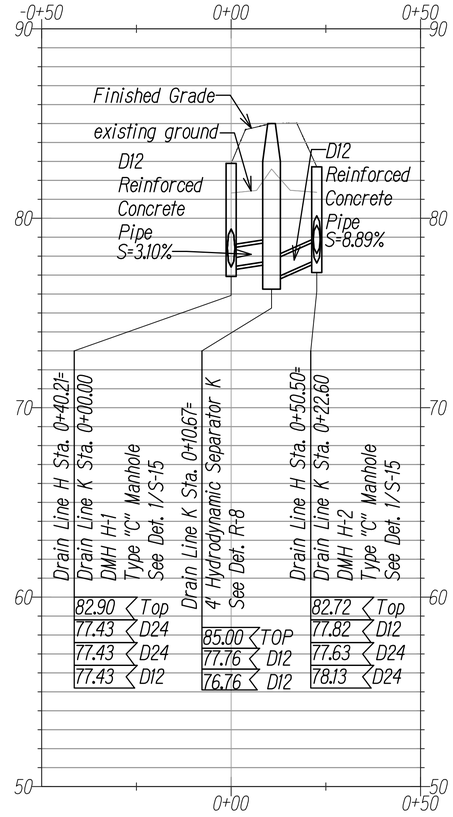
DRAIN LINE I PROFILE

Scale: Horiz: 1" = 20'
Vert: 1" = 4'



DRAIN LINE J PROFILE

Scale: Horiz: 1" = 20'
Vert: 1" = 4'



DRAIN K PROFILE

Scale: Horiz: 1" = 20'
Vert: 1" = 4'

⚠	DATE	REVISION
⚠	10/21/2022	Revised DL K, revised pipe material

Graphic Scale

1" = 20' 20' 10' 0 20' 40'

1" = 4' 4' 2' 0 4' 8'

CHRISTOPHER H. BALL * LICENSED PROFESSIONAL ENGINEER No. 12144-C * HAWAII, U.S.A.

This work was prepared by me or under my supervision

Chris Ball 4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PROFILES 6

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

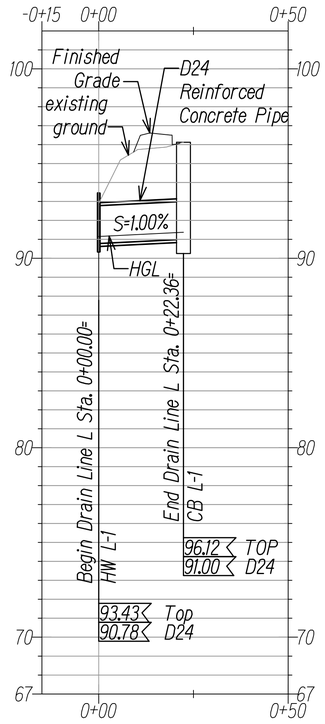
Scale: As Noted Date: August 2022

SHEET No. **D-11** OF **167** SHEETS

ADD. 91

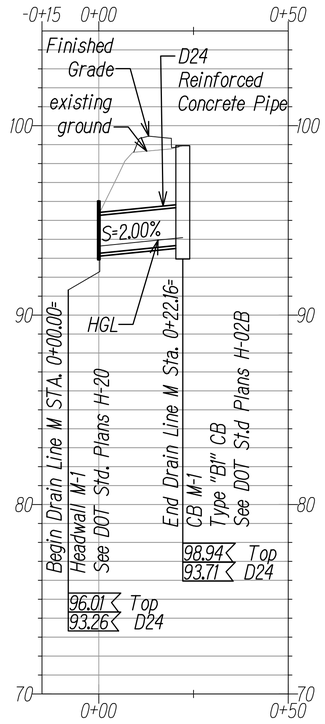
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
No.	TRACED BY	
	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 92	167



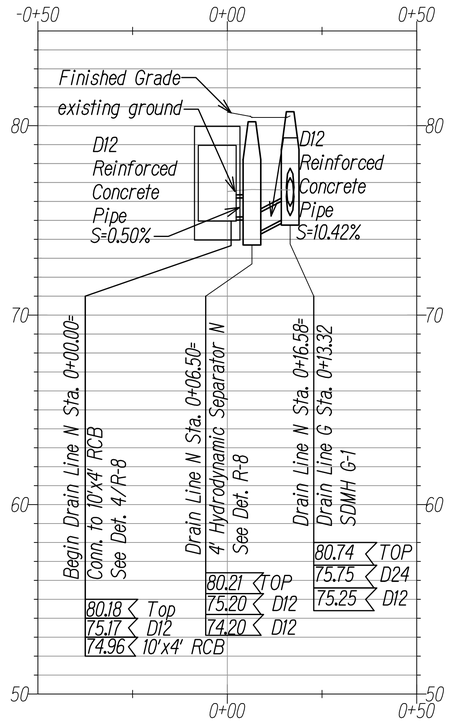
DRAIN LINE L PROFILE

Scale: Horiz: 1" = 20'
Vert: 1" = 4'



DRAIN LINE M PROFILE

Scale: Horiz: 1" = 20'
Vert: 1" = 4'



DRAIN LINE N PROFILE

Scale: Horiz: 1" = 20'
Vert: 1" = 4'

⚠

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
	TRACED BY	
	DESIGNED BY	
	QUANTITIES BY	
No.	CHECKED BY	

Graphic Scale

1" = 20' 20' 10' 0 20' 40'

1" = 4' 4' 2' 0 4' 8'

CHRISTOPHER H. BALL
LICENSED PROFESSIONAL ENGINEER
No. 12144-C
HAWAII, U.S.A.

This work was prepared by me or under my supervision

4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

⚠	10/21/2022	Added DL N profile
	DATE	REVISION

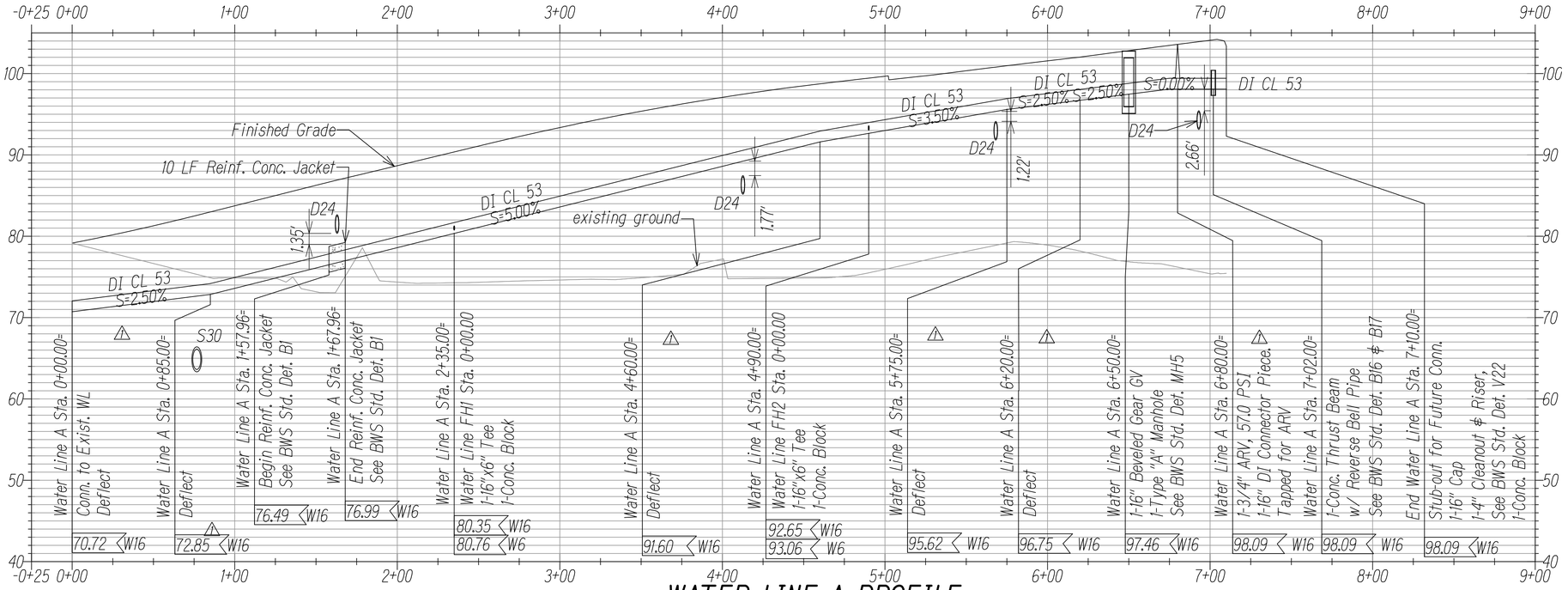
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PROFILES 7

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

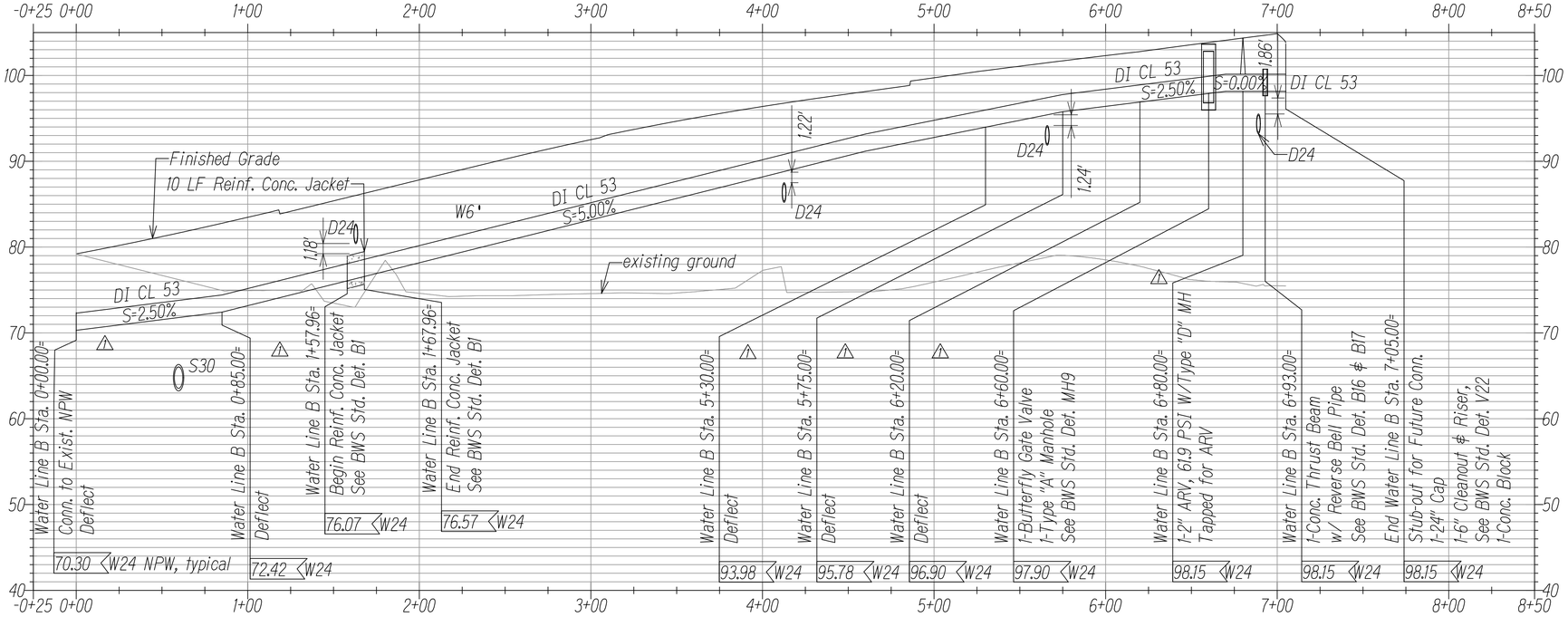
Scale: As Noted Date: August 2022

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-HI-1(271)	2022	ADD. 97	167



WATER LINE A PROFILE

Scale: Horiz: 1" = 40'
Vert: 1" = 8'



WATER LINE B PROFILE

Scale: Horiz: 1" = 40'
Vert: 1" = 8'

ORIGINAL PLAN
NOTE BOOK

SURVEY PLOTTED BY _____ DATE
DRAWN BY _____ : : :
TRACED BY _____ : : :
DESIGNED BY _____ : : :
QUANTITIES BY _____ : : :
CHECKED BY _____ : : :

Graphic Scale

1" = 40' — 40' 20' 0 40' 80'

1" = 8' — 8' 4' 0 8' 16'

Approved:

Manager and Chief Engineer, BWS — Date
(For Work Affecting BWS Facilities in City/State R/W and BWS Easement Only)

DATE	REVISION
10/21/2022	Removed DI Connector Piece

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WATER PROFILE 1

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-HI-1(271)

Scale: As Noted — Date: August 2022

CHRISTOPHER H. BALL
LICENSED PROFESSIONAL ENGINEER
No. 12144-C
HAWAII, U.S.A.

This work was prepared by me or under my supervision

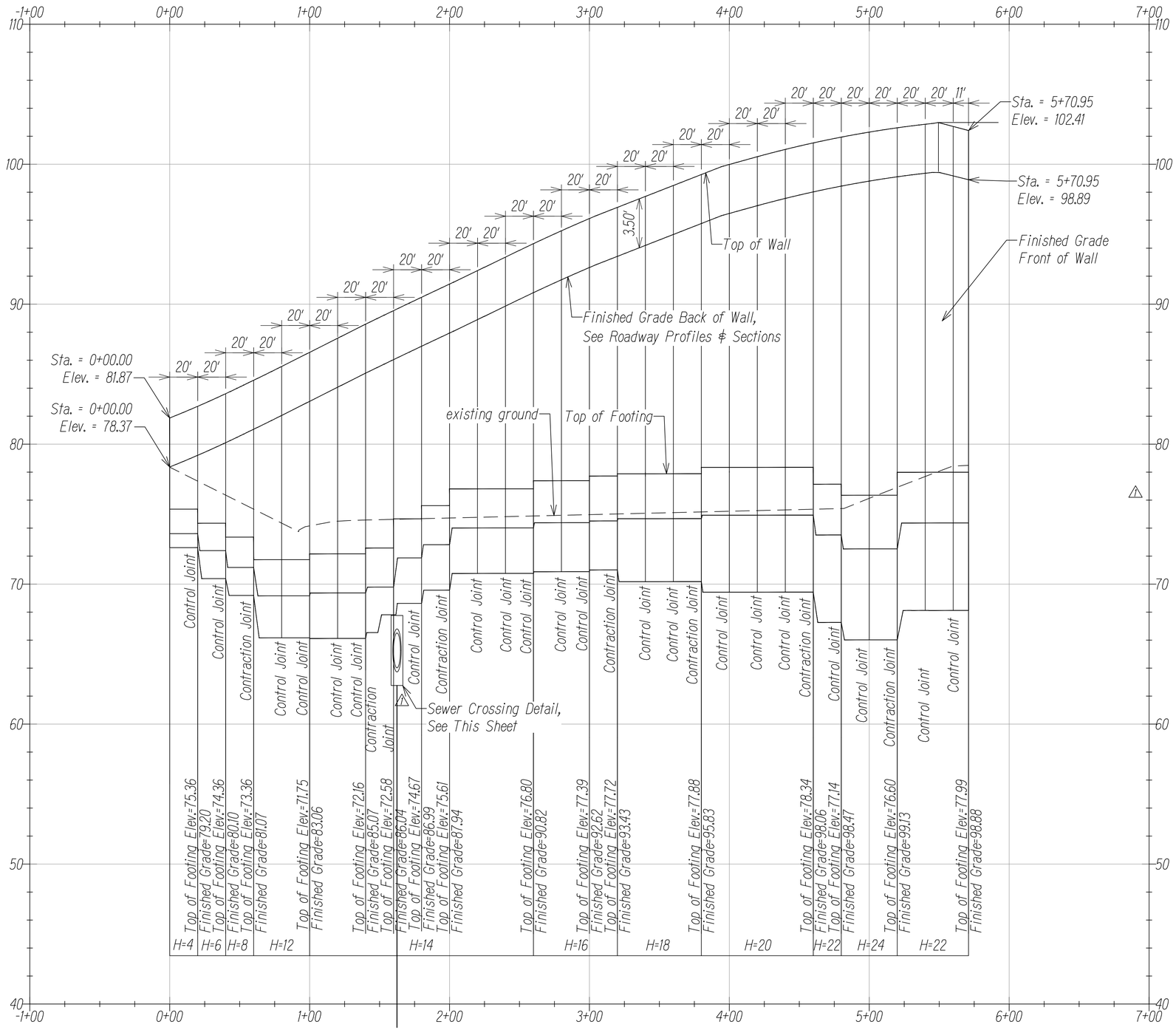
4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

SHEET No. **U-5** OF **167** SHEETS

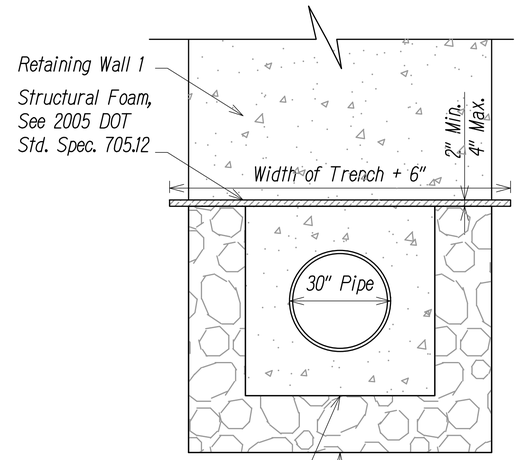
ADD. 97

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 99	167



RETAINING WALL 1 PROFILE

Scale: Horiz: 1" = 40'
Vert: 1" = 8'



Notes:

1. Retaining Wall concrete to be poured over structural foam.
2. Structural Foam to be wider than trench to extend beyond width of concrete.

SEWER CROSSING DETAIL

Scale: 1" = 2'

1 / RW-1

Graphic Scale

1" = 40' 40' 20' 0 40' 80'

1" = 8' 8' 4' 0 8' 16'

	DATE	REVISION
⚠	10/21/2022	Revised sewer crossing location

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALL PROFILES 1

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

Scale: As Noted Date: August 2022

CHRISTOPHER H. BALL
LICENSED PROFESSIONAL ENGINEER
No. 12144-C
HAWAII, U.S.A.

This work was prepared by me or under my supervision

Chris Ball 4/30/2024
MITSUNAGA & ASSOCIATES, INC. EXP. DATE

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

SHEET No. RW-1 OF 167 SHEETS

ADD. 99

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	"
NOTE BOOK	TRACED BY	"
	DESIGNED BY	"
	QUANTITIES BY	"
No.	CHECKED BY	"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 122	167

Harbor Access Road Phase 2

Kapolei Interchange Complex Phase 3

Begin Retaining Wall 1 Sta. 0+00.00
Harbor Access Road Sta. 13+99.99= ⚠
Offset: 56.00' Rt.

Property Line

5.75'

21.67'

See Sht. ADD. 99 - RW-1 - RETAINING WALL PROFILES 1 for Retaining Wall 1 Profile

End Retaining Wall 1 Sta. 5+70.95
Harbor Access Road Sta. 19+50.74=
Offset: 112.59' Rt.

0+00 1+00 2+00 3+00 4+00 5+00 6+00 7+00 8+00 9+00 9+33 10+00 11+00 12+00 13+00 13.39' 14+00 15+00 16+00 17+00 18+00 18+34 19+00 20+00 21+00 22+00 23+00

Easement 10200

0.83'

10.67'

10.67'

See Sht. 100 - RW-2 - RETAINING WALL PROFILES 2 for Retaining Wall 2 Profile

See Sht. ADD. 126 - S-7 - LIGHT BASE DETAILS for Light Standard Base Section on Retaining Wall

Begin Retaining Wall 2 Sta. 0+00.00
Harbor Access Road Sta. 13+99.99=
Offset: 54.00' Rt.

End Retaining Wall 2 Sta. 9+32.87
Harbor Access Road Sta. 22+46.71=
Offset: 12.00' Rt.

OVERALL RETAINING WALL PLAN

1
S-3 | S-3

Scale: 1" = 40'

Graphic Scale

1"= 40' 40' 20' 0 40' 80'

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
NOTE BOOK	TRACED BY	
	DESIGNED BY	
No.	QUANTITIES BY	
	CHECKED BY	

DENNIS K. MITSUNAGA
LICENSED PROFESSIONAL ENGINEER
No. 2422-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

MITSUNAGA & ASSOCIATES
LICENSE EXPIRES 4-30-24

⚠	10/21/2022	Revised sta, added callout
	DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

OVERALL RETAINING WALL PLAN

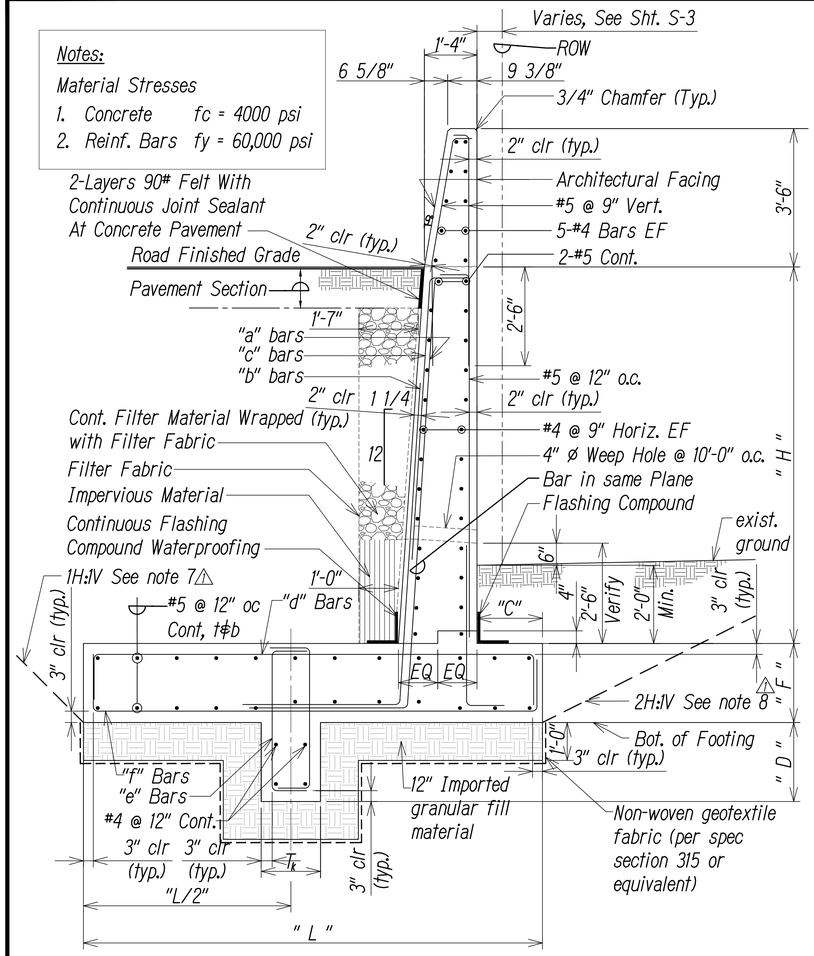
INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

Scale: As Noted Date: August 2022

SHEET No. **S-3** OF **167** SHEETS

ADD. 122

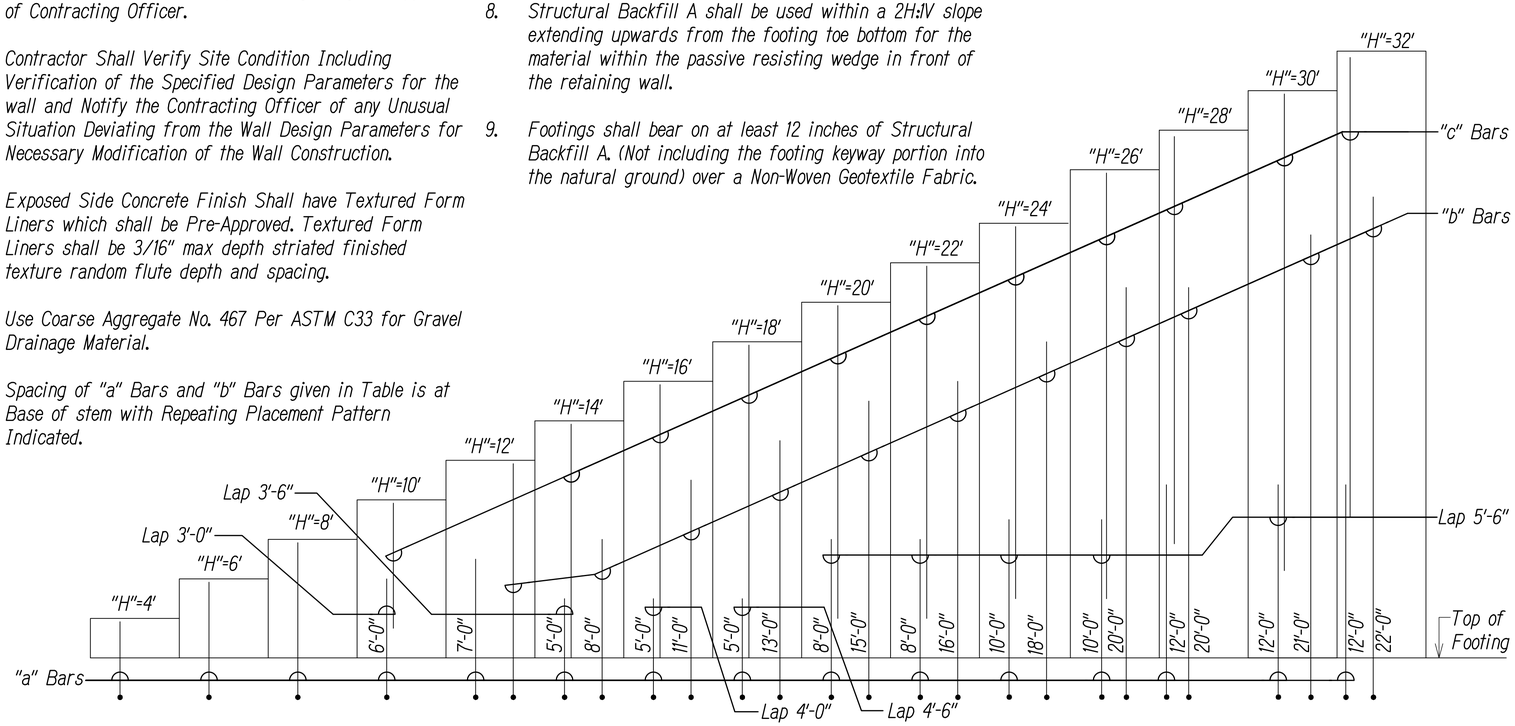
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 124	167



1 S-5 | S-5 *Typical Wing Wall Section*
Not to Scale

Notes:

1. *When working within or adjacent to existing structure, Contractor shall employ appropriate Earth Retention System (Such as Piling) not to Impair Load Bearing Capacity of existing foundation prior to commencement of excavation for the wall construction. This Earth Retention System may be temporary or permanent depending on Site Condition, and subjecting to approval of Contracting Officer.*
2. *Contractor Shall Verify Site Condition Including Verification of the Specified Design Parameters for the wall and Notify the Contracting Officer of any Unusual Situation Deviating from the Wall Design Parameters for Necessary Modification of the Wall Construction.*
3. *Exposed Side Concrete Finish Shall have Textured Form Liners which shall be Pre-Approved. Textured Form Liners shall be 3/16" max depth striated finished texture random flute depth and spacing.*
4. *Use Coarse Aggregate No. 467 Per ASTM C33 for Gravel Drainage Material.*
5. *Spacing of "a" Bars and "b" Bars given in Table is at Base of stem with Repeating Placement Pattern Indicated.*
6. *Dimensions next to "a" Bars and "b" Bars Indicates Distance from Top of Footing to Upper End of Bars.*
7. *Structural Backfill A shall be used within a 1H:1V slope extending upwards from the footing heel bottom for the retained backfill.*
8. *Structural Backfill A shall be used within a 2H:1V slope extending upwards from the footing toe bottom for the material within the passive resisting wedge in front of the retaining wall.*
9. *Footings shall bear on at least 12 inches of Structural Backfill A. (Not including the footing keyway portion into the natural ground) over a Non-Woven Geotextile Fabric.*



2 S-5 | S-5 *Vertical Reinforcement Steel Arangement*
Not to Scale

Dimensions and Reinforcing Steel for Retaining Walls

Stem Design Height - "H"	≤4'-0"	≤6'-0"	≤8'-0"	≤10'-0"	≤12'-0"	≤14'-0"	≤16'-0"	≤18'-0"	≤20'-0"	≤22'-0"	≤24'-0"	≤26'-0"	≤28'-0"	≤30'-0"	≤32'-0"
Footing Width - "L"	7'-0"	8'-0"	9'-0"	10'-6"	13'-0"	15'-0"	17'-0"	18'-6"	19'-6"	21'-6"	22'-6"	23'-6"	25'-4"	28'-0"	31'-9"
Toe - "C"	8"	8"	8"	8"	1'-6"	1'-6"	2'-0"	2'-6"	2'-9"	3'-6"	3'-9"	5'-0"	6'-4"	7'-0"	7'-9"
Footing Depth - "F"	1'-9"	1'-11 1/2"	2'-2"	2'-4 1/2"	2'-7"	2'-9 1/2"	3'-0"	3'-2 1/2"	3'-5"	3'-7 1/2"	3'-10"	4'-1/2"	4'-3"	4'-5 1/2"	4'-8"
Key Depth - "D" x "T_k"	1'-0" x 1'-6"	2'-0" x 1'-6"	2'-0" x 1'-6"	2'-6" x 1'-6"	3'-0" x 1'-6"	3'-3" x 1'-6"	3'-6" x 2'-0"	4'-6" x 2'-6"	5'-6" x 2'-6"	6'-3" x 2'-6"	6'-6" x 3'-0"	7'-6" x 3'-0"	8'-6" x 3'-6"	9'-0" x 4'-0"	9'-6" x 4'-0"
"a" Bars	#5 @ 9"	#5 @ 9"	#5 @ 9"	#6 @ 9"	#6 @ 9"	#6 @ 9"	#7 @ 9"	#8 @ 9"	#9 @ 9"	#10 @ 9"	#10 @ 9"	#10 @ 9"	#10 @ 9"	#11 @ 9"	#11 @ 9"
"b" Bars	—	—	—	—	#6 @ 9"	#6 @ 9"	#7 @ 9"	#8 @ 9"	#9 @ 9"	#10 @ 9"	#10 @ 9"	#10 @ 9"	#10 @ 9"	#11 @ 9"	#11 @ 9"
"c" Bars	—	—	—	#5 @ 9"	—	#6 @ 9"	#6 @ 9"	#6 @ 9"	#7 @ 9"	#7 @ 9"	#7 @ 9"	#7 @ 9"	#9 @ 9"	#10 @ 9"	#10 @ 9"
"d" Bars	#5 @ 9"	#5 @ 9"	#5 @ 9"	#6 @ 9"	#6 @ 4 1/2"	#6 @ 4 1/2"	#7 @ 4 1/2"	#8 @ 4 1/2"	#9 @ 4 1/2"	#10 @ 4 1/2"	#10 @ 4 1/2"	#10 @ 4 1/2"	#10 @ 4 1/2"	#11 @ 4 1/2"	#11 @ 4 1/2"
"e" Bars	#5 @ 12"	#5 @ 12"	#5 @ 12"	#5 @ 12"	#5 @ 12"	#5 @ 12"	#5 @ 6"	#5 @ 6"	#5 @ 6"	#5 @ 6"	#6 @ 6"	#6 @ 6"	#6 @ 6"	#6 @ 6"	#6 @ 6"
"f" Bars	#5 @ 6"	#5 @ 6"	#5 @ 6"	#5 @ 6"	#5 @ 6"	#5 @ 6"	#5 @ 6"	#6 @ 6"	#6 @ 6"	#7 @ 6"	#7 @ 6"	#8 @ 6"	#8 @ 6"	#8 @ 6"	#8 @ 6"

DESIGN PARAMETERS

Design Parameters: Service Level
Angle of Internal Friction of Backfill Material = 30°
Coefficient of Friction = 0.34
Soil Allowable Bearing Pressure = 4000 psf
Active Earth Pressure Coefficient = 36 pcf
Passive Earth Pressure Coefficient kp = 138 pcf
Risk Category: II
Seismic Importance Factor = 1.0
Mapped Spectral Acceleration
SS=0.552G
S1=0.155G
Site Class = D
Spectral Response Coefficients
S_DS = 0.50G
S_D1 = 0.225G
Seismic Design Category = D

DATE	REVISION
⚠ 10/21/2022	Revised note 3 and note callouts

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL RETAINING WALL SECTIONS

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS (Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

Scale: As Noted *Date: August 2022*

DENNIS K. MITSUNAGA LICENSED PROFESSIONAL ENGINEER No. 2422-S HAWAII, U.S.A.

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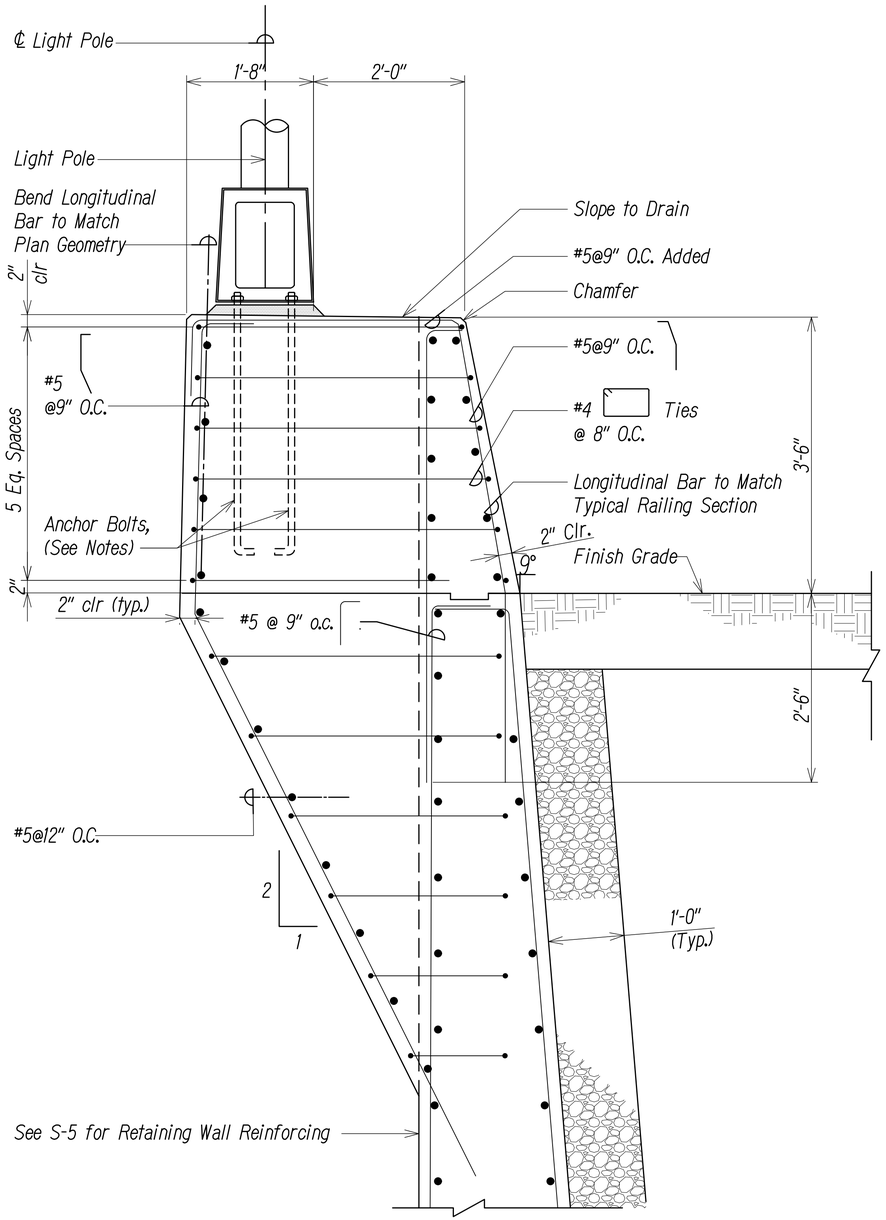
MITSUNAGA & ASSOCIATES
LICENSE EXPIRES 4-30-24

SHEET No. **S-5** OF **167** SHEETS

ADD. 124

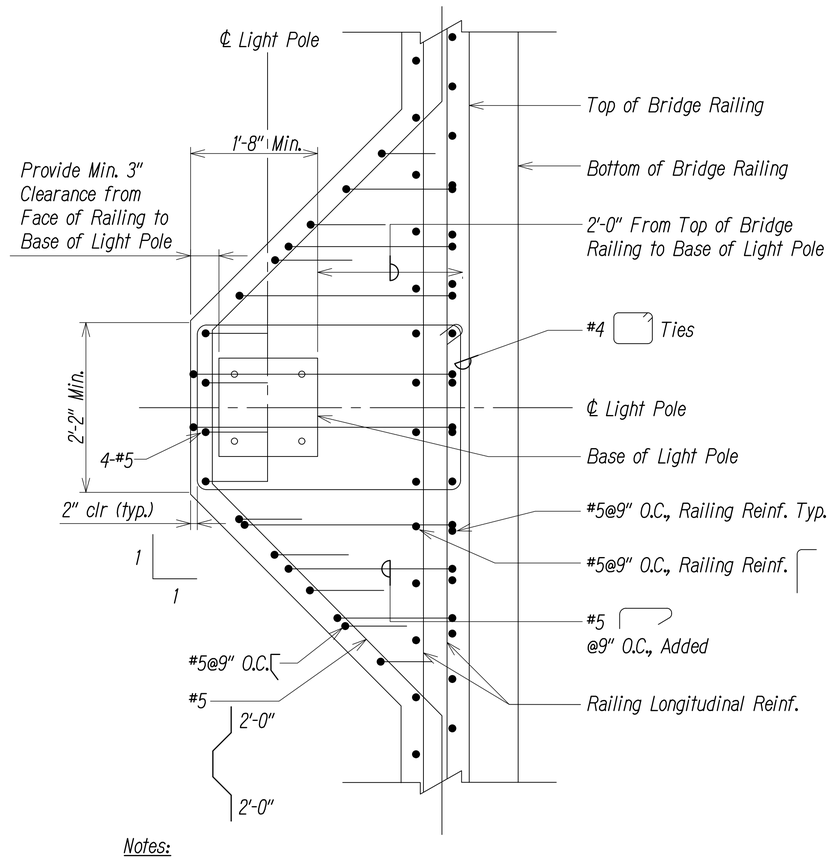
ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE
NOTE BOOK | No.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 126	167



1 S-7 | S-7 Light Standard Base Section on Retaining Wall

Scale: 1"=1'-0"



Notes:

1. For Anchor Bolt Size and Embedment See Electrical Plans.

2 S-7 | S-7 Light Standard Base - Plan

Scale: 1"=1'-0"

⚠ Notes:

1. See Electrical sheet EA-1 for the Electrical Symbols that designates Highway Light Standard, Bracket Arm and Luminaire Mounted on New Retaining Wall or Barrier Wall.
2. See Electrical sheets EB-5 for Pole 32 and EB-10 for Pole 34, Pole 36, and Pole 40 for Luminaire Mounted on New Retaining Wall locations.

⚠	10/21/2022	Added Notes
	DATE	REVISION

DENNIS K. MITSUNAGA * LICENSED PROFESSIONAL ENGINEER * No. 2422-S * HAWAII, U.S.A.

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MITSUNAGA & ASSOCIATES
LICENSE EXPIRES 4-30-24

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

LIGHT BASE DETAILS

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

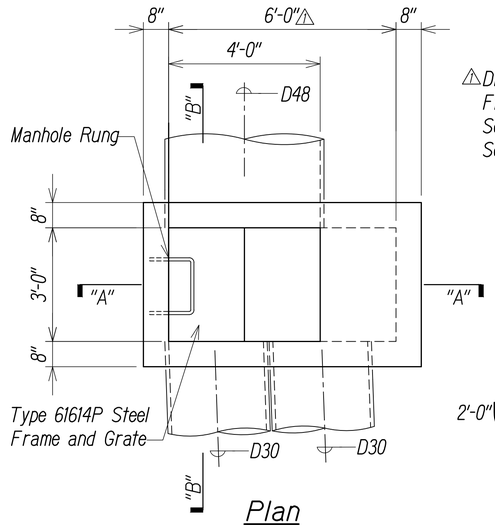
Scale: As Noted Date: August 2022

SHEET No. **S-7** OF **167** SHEETS

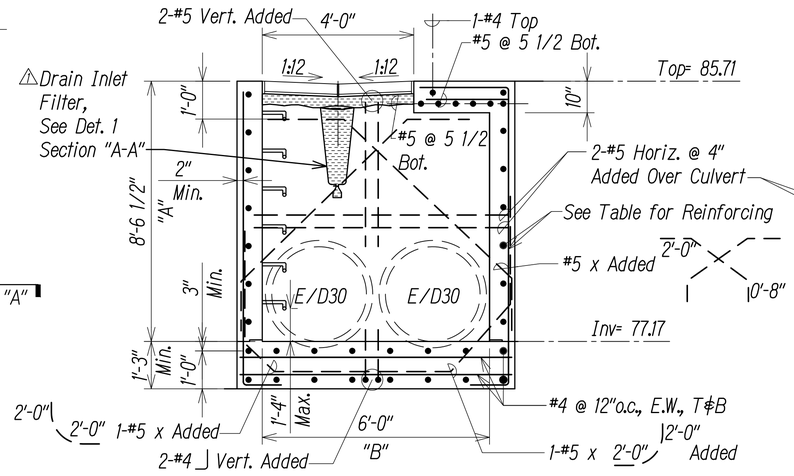
ADD. 126

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
No.	TRACED BY	
	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

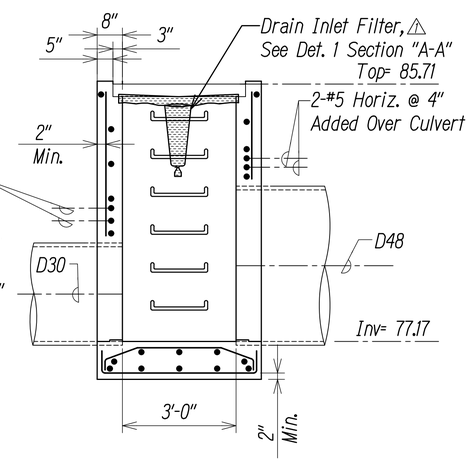
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-HI-1(271)	2022	ADD. 130	167



Plan



Section "A - A"



Section "B - B"

Drain Inlets I-1, I-2 Reinforcing
Vertical Bars for Grated Drop Inlet #4 @ 8"

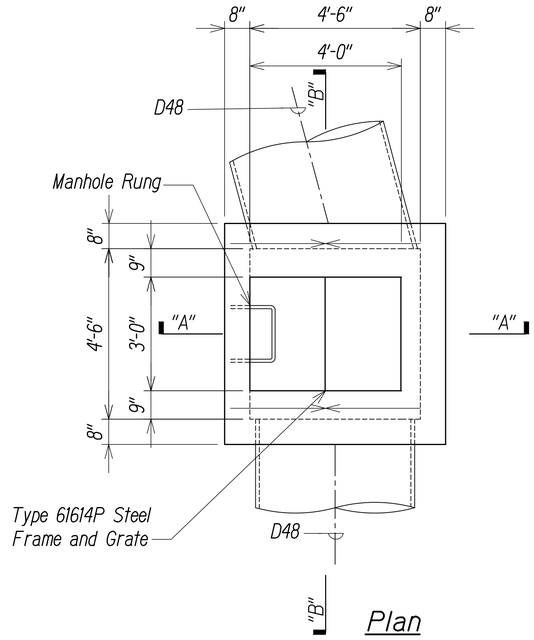
Horiz. "A" Bars for Grated Drop Inlet		
Depth "A"	"A" Bars	
	"B"-3'-0" to 4'-5"	"B"-4'-6" to 6'-0"
0'-0"-5'-0"	#4@12"	#5@10"
5'-1"-10'-0"	#4@10"	#5@8"
10'-1"-15'-0"	#4@8"	#5@6"

Note:
1. For Remainder of Details; see:
   a. Construction Joint and Waterproofing - See Std. Plan H-05
   b. Added Reinforcing at Culvert and Manhole opening - See Std. Plan H-06
   c. Manhole Rungs - See Std. Plan H-07

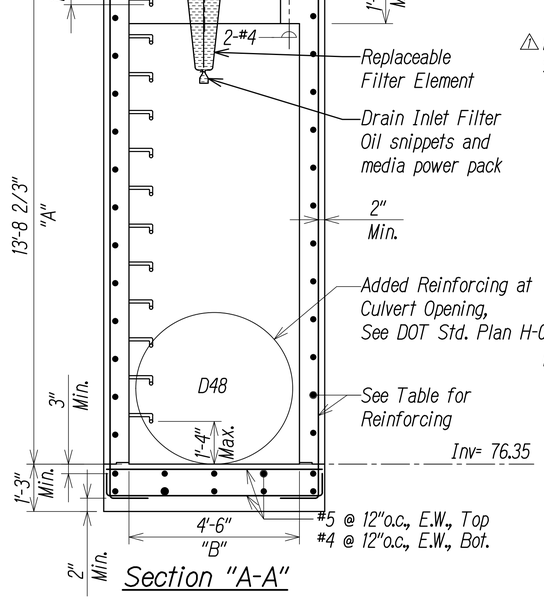
Modified Type 61614P Drain Inlet I-2

Scale: 1/2"= 1'-0"

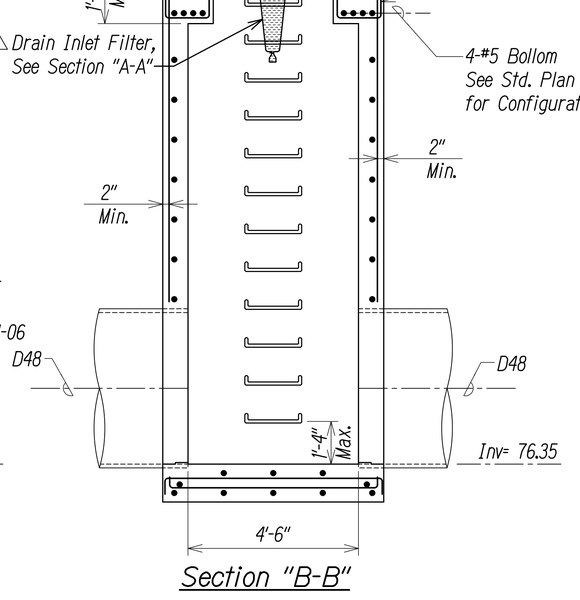
2 D-3 S-11



Plan



Section "A-A"



Section "B-B"

Modified Type 61614P Drain Inlet I-1

Scale: 1/2"= 1'-0"

1 D-3 S-11

Note: See typical wall corner reinforcing and typical opening reinforcing on S-13.

Graphic Scale

2 1 0 2 4ft

1/2"= 1'-0"

	DATE	REVISION
⚠	10/21/2022	Added drain inlet filter, revised width to 6'-0"

DENNIS K. MITSUNAGA
LICENSED PROFESSIONAL ENGINEER
No. 2422-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

MITSUNAGA & ASSOCIATES
LICENSE EXPIRES 4-30-24

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS 4

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-HI-1(271)

Scale: As Noted Date: August 2022

SHEET No. S-11 OF 167 SHEETS

ADD. 130

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
NOTE BOOK	TRACED BY	
	DESIGNED BY	
No.	QUANTITIES BY	
	CHECKED BY	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 156	167

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ORIGINAL PLAN	
NOTE BOOK	
No.	
SURVEY PLOTTED BY	DATE
DRAWN BY	"
TRACED BY	"
DESIGNED BY	"
QUANTITIES BY	"
CHECKED BY	"

⚠	DATE	REVISION
	10/21/2022	Added sheet

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

Scale: As Noted Date: August 2022

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

Project: INTERSTATE ROUTE H-1 ADDITION AND MODIFICATION OF FREEWAY ACCESS (KAPOLEI INTERCHANGE COMPLEX), PHASE 3 FEDERAL-AID PROJECT NO. NH-H1-1(271)

Prospective bidders had submitted RFI's via HIePRO. Questions and responses are as follows:

1. Are Post mounted Advisory Boards (Notice to Motorist) Required Per Spec 645.03(G) Advisory Signs. Submit advisory sign shop drawings. Construct, install, maintain, and remove two advisory signs as ordered by the Engineer. Place signs at locations designated by the Engineer. Provide signs, minimum B feet wide by 4 feet high, with black letters on orange background, and with three 4,00 pounds/foot flanged channel posts for each sign? If so, can you please provide quantity and the locations?

As noted per spec section 645.03(G), provide a quantity of 2 signs, and locations shall be designated by the Engineer (the construction engineer).

2. On sheet 52 Galvanized Steel RM-5 is called out, typically on current projects with MGS Guardrail plastic RM-5 called out. Can you please clarify the type of RM-5 for the project?

Revised to plastic RM-5. See revised sheet 52 in Addendum No. 2.

3. On sheet 52 there is a picture of a guardrail splice on the block and post, for MGS MASH Guardrail, typically the splice is midspan and on the block and the post, can you please clarify?

See revised sheet 52 in Addendum No. 2.

4. on sheet 53 Note 3 calls out NCHRP-350 approved Guardrail End Terminals, but the pay items call out MASH approved End Terminals, can you please clarify?

Revised to MASH. See revised sheet 53 in Addendum No. 2.

5. For the strong post in rock drilling notes on sheet will this drilling be required for every guardrail post?

Rock drilling is not anticipated based on the geotechnical borings. Detail is provided in the situation if rock is encountered.

6. Is there a pre-bid meeting attendees list available?

See Addendum No. 2.

7. We are currently bidding a large number of projects. We would like to humbly request a 3-4 extension to the bid date.

We are extending the bid open date to make additional changes to the plans that will be included in Addendum No. 3.

8. Our takeoff quantities are substantially lower than the proposal quantities for the items listed below. Please Clarify. a. Bid Item 603.0800 Reinforced Concrete Jacket for Drainline b. Bid Item 605.0200 6" Perforated Underdrain Pipe c. Bid Item 204.0200 Trench Backfill for Water Line

Quantities for certain items have been revised and some items have been deleted. However, quantities provided in the proposal are approximate and should be verified by the Contractor. See revised proposal schedule in Addendum No. 2.

9. Bid Item 202.0500 Removal of Existing Cantilever OH Sign, Foundation: Please provide as-built design of foundation and provide limits of foundation removal.

See as-built sheets and DOT Standard Detail sheets TE-19B, TE-19D, & TE-17A in Addendum No. 2. Demolish and remove to bottom of pile cap.

10. The geotechnical report recommends over-excavating by at least 18 inches due to the surface soils having substantial shrinkage cracks. Will this work be required? if so, in what bid item will it be paid for under?

Recommendations of the Geotech report are required per Grading Note 1, Sheet T-8. Overexcavation for substantial shrinkage cracks shall be considered incidental to bid item 203.0100 Roadway Excavation. See revised Sheet T-8 in Addendum No. 2.

11. The geotechnical report recommends removing soft and yielding materials, if encountered. Requesting that a unit price/allowance bid item be provided for this work.

Soft and yielding materials are not expected to be encountered. No bid item will be included. However, if these materials are encountered, it will be addressed and paid for by change order.

12. Due to the substantial embankment fill required, ground settlement may occur. a. Will extra surcharge material be required to account for this settlement? Since the settlement depths are unknown, please provide a separate bid item for this work. b. Plan Sheet T-8, Grading Note 2

states that the Contractor shall install settlement gauges. Since the duration for settlement is unknown, please provide a unit price bid item for this work. c. Since the duration of ground settlement is unknown, where will the Contractor be paid for potential delays?

a. As indicated in the geotechnical report, we anticipate settlement will occur during and after construction of the high fill embankment. This cost shall be incidental to the earthwork items.
b. Cost shall be incidental to earthwork.
c. As indicated in our geotechnical report, the estimated time to achieve 90 percent consolidation is about 2 months. Contractor shall anticipate a maximum of 4 months. See revised notes on Sheet T-8 in Addendum No. 2.

13. Plan Sheet SP-4 (page 62): In what bid item will "Restore Topsoil and Grass" be covered? How thick is the topsoil required?

This cost shall be incidental to the earthwork. Required topsoil thickness shall be 4". See revised plans in Addendum No. 2.

14. Plan Sheet T-3, General Note 25: Is there a designated stockpile/storage area?

Per the note, the Contractor needs to make a request to the Engineer for areas that they want to use for stockpiling and storage within the highway right of way.

15. Detail 6/T-13 shows 1.5" HMA Pavement w/ 6" subbase. However, Typical Sections only show the 1.5" HMA Pavement. Please clarify if 6" subbase is required.

Follow detail 6/T-13. 6" subbase is required. Typical sections revised to show the 6" subbase. See Addendum No. 2.

16. Please provide the 12" Concrete Pavement Jointing Plan.

Contractor shall submit jointing plan per GENERAL PORTLAND CEMENT CONRETE (PCC) PAVEMENT AND JOINTING NOTES note 6 on sheet T-8. Concrete pavement jointing shall follow DOT Std. Plan D-18 and spec section 411.

17. Plan Sheet S-5, Retaining Wall, Note 3: Please provide specifications for the textured form liners.

See revised Sheet S-5, Note 3 in Addendum No. 2.

18. Bid Item 205.0200 Structural Backfill for Concrete Retaining Walls. a. Please confirm that the structural backfill per Notes 7 and 8 on Sheet S-5 shall be included in this bid item. If so, bid proposal quantity is significantly low. Please clarify.

Revised bid item 205.0200 Structural Backfill quantity from 1,400 CY to 25,000 CY and item 203.0200 Borrow Excavated Material from 75,000 CY to 51,400 CY. See revised proposal schedule in Addendum No. 2.

19. Sheet S-7 shows a light base detail. Please provide locations where this is required.

Added callout pointing to locations of light base locations on sheet S-3 Overall Retaining Wall Plan. See Addendum No. 2.

20. Bid Item 605.0100 6" Underdrain Pipe – Please clarify where this item is required. Per detail 1/T-13, underdrain pipe is perforated.

Removed bid item 605.0100 6" Underdrain Pipe. There is only 6" perforated underdrain pipe. See revised proposal schedule in Addendum No. 2.

21. In what bid item will the 24" Corrugated HDPE Pipe be paid under?

Removed 24" Corrugated HDPE Pipe. All pipes should be RCP, minimum Class 3. See revised plans and proposal schedule in Addendum No. 2.

22. Bid Item 603.0300, 18" RCP, CL III – Reference Sheet D-11, Drain K Profile – Please clarify if the 18" Pipe is RCP or Corrugated HDPE?

Revised to 12" RCP. See revised plans and proposal schedule in Addendum No. 2.

23. Please confirm if aggregate subbase is required under all drainage structures.

Per Geotech Report, provide 12" cushion layer consisting of aggregate subbase materials 95% compaction under box culvert; 6" aggregate subbase under all drainage structures following spec section 703.17.

24. Please clarify length of the box culvert as lengths in Sheets S-4 and D-6 don't match.

The dimensioned lengths on sheet S-4 are dimensioning outside of box culvert. The length and azimuth on centerline of box culvert match the sheet D-6 Drain Line A profile.

25. Referencing Water Detail Sheets R-13, 14: In what item will cathodic protection be paid under?

Cathodic Protection to be paid under Item No. 624.0100 – Water Systems. See revised sheets Addendum No. 2.

26. Plan Sheet U-5 (page 97): Please clarify "DI Connector Piece" for all stations where this is stated.

Removed DI Connector pieces from plans. See Addendum No. 2.

27. Sheet D-2, Sta. 19+50.44 to Sta. 21+00 on Harbor Access Road shows a 6" underdrain. However, Sheet D-5 doesn't show any 6" underdrain. Please clarify.

Removed 6" underdrain on sheet D-2 and added callout to reference sheet D-5 for 6" underdrain. See revised plans in Addendum No. 2.

28. Referencing Sheets D-2 and D-5. Please clarify length of Drain Line K.

Drain Line K is 23'. See sht. D-11 Drain Line K Profile.

29. Please provide locations of Bid Item 604.2100 Type "C1" Catch Basin, 6'-6.99'.

Revised bid item 604.2200 from "Type "C1" Catch Basin, 6 Feet to 6.99 Feet" to "Type "C1" Catch Basin, 2 Feet to 2.99 Feet" and quantity from 2 Each to 1 Each. See sheet D-4 for catch basin locations. See Addendum No. 2.

30. Detail 2/S-11: Plan detail shows an inside width of 6'-9" while Section "A-A" shows an inside width of 6'-0". Which one is correct?

Revised plan view to 6'-0". See Addendum No. 2.

31. Referencing Sheet S-16: In what bid item will the concrete end posts be paid under?

Added bid item 503.0900 Concrete in End Posts for concrete end posts. See revised proposal schedule in Addendum No. 2.

32. Referencing Proposal Schedule for New Sewer Facilities, 209.0300 Installation, Maintenance, Monitoring and Removal of B.M.P.: What work is required for this bid item that is not already covered in the overall?

Item 209.0300 is for any erosion and sediment control work done specifically for the sewer work as shown on sheet U-1.

33. Referencing Proposal Schedule for New Sewer Facilities, 645.0300 Traffic Control: Please provide traffic control plan for this bid item.

Deleted item 645.0300 Traffic Control in Proposal Schedule for New Sewer Facilitates. See revised proposal schedule in Addendum No. 2.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-H1-1(261)	2015	ADD. 176	524

Notes:

1. *For Traffic Control Plan H-1 Inbound Closure/ Detours, See Sht. TC-4 - Phasing Plan 2; and For Kalaeloa Blvd. Closure/Detour, See Sht. TC-5 - Phasing Plan 3.*
2. *For Interstate Route H-1 Closure/Detour, See Sht. TC-3.*
3. *For Interstate Route H-1 Inbound Lane Closures and Detour Between Kalaeloa Blvd. and Wakea Street, See Sht. TC-4 - Phasing Plan 2.*
4. *Contractor to Remove Existing Callbox Sign Poles and Foundations and Restore the Work Area Back to Existing Surrounding Condition.*

TRUE NORTH
SCALE : 1" = 100'

EXIT 1 A
Kalaeloa Blvd
12'
Travel Lane

EXIT 1 B | EXIT 1 A
H1 EAST Honolulu | Makakilo Kapolei Kalaeloa 1/4 MILE | Campbell Industrial Park Barbers Point Harbor

℄ Sta. 202+40 Farrington Hwy
Demolish and Remove Exist. Overhead Sign Structure w/ Guide Signs

SIGN 4 (EB-0H)
℄ Sta. 202+11 Farrington Hwy
Cantilever Overhead Sign (L=28') w/ Guide Signs.
See Std. Plan TE-19B ⊕ TE-19D For Guide Signs, See Guide Sign Det. Sht. SG-26, For Enlargement See Sht. SG-13, For Traffic Control Plan, See Note 1 This Sht, For Frame, See Std. Plan TE-17A.

EXIT 1 B
H1 EAST Honolulu | Wakea St 1/4 MILE
SIGN 5 (EB-0H) 12' Travel Lane
SIGN 6 (EB-0H) 12' Travel Lane

℄ Sta. 202+11 Farrington Hwy
Cantilever Overhead Sign (L=34') w/ Guide Signs.
See Std. Plan TE-19B ⊕ TE-19D For Guide Signs, See Guide Sign Det. Sht. SG-26, For Enlargement See Sht. SG-13, For Traffic Control Plan, See Note 1 This Sht.

EXIT 25 M.P.H.
SPEED LIMIT 25
EXIT 1A
Barbers Point Harbor
EMERGENCY STATE OF HAWAII CALL BOX
H1 QUEEN LILIUOKALANI FREEWAY
Kalaeloa Barbers Point Harbor
EXIT 1 B Makakilo Kapolei Kalaeloa

H1 FREEWAY
End Freeway
KALAELOA BLVD

WEST 93
STOP ALL WAY
CAMPBELL INDUSTRIAL PARK KALAELOA BARBERS POINT HARBOR
Campbell Industrial Park Kalaeloa Barbers Point Harbor KEEP RIGHT
See Note 2 This Sht.
CAMPBELL INDUSTRIAL PARK KALAELOA BARBERS POINT HARBOR
LANE ENDS MERGE LEFT
RAMP 25 M.P.H.
EXIT 1
Kalaeloa Barbers Point Harbor
See Note 2 This Sht.
℄ H1 Freeway

SIGN 7 (EB-0H)
℄ Sta. 46+00 H1 Freeway
Cantilever Overhead Sign Frame (L=40') w/ Guide Sign.
For Frame, See Std. Plan TE-17A
For Guide Sign, See Guide Sign Det. Sht. SG-26, For Enlargement, See Sht. SG-14, For Traffic Control Plan, See Note 3 This Sht.

EXIT 1 B
Wakea St
12'
Travel Lane

EXIT 25 M.P.H.
EXIT 1B
SLOWER TRAFFIC KEEP RIGHT
EISENHOWER INTERSTATE SYSTEM

FARRINGTON HWY
Waianae
Campbell Industrial Park Kalaeloa Barbers Point Harbor
CAMPBELL INDUSTRIAL PARK KALAELOA BARBERS POINT HARBOR
EAST INTERSTATE H1
Kapolei Kalaeloa Barbers Point Harbor

EXIT 1
Kalaeloa Blvd
12'
Travel Lane

SIGN 9 (WB-0H)
℄ Sta. 53+84 H1 Freeway
Cantilever Overhead Sign Frame (L=34') w/ Guide Sign.
For Frame, See Std. Plan TE-17A
For Guide Sign, See Guide Sign Det. Sht. SG-27, For Enlargement, See Sht. SG-15, For Traffic Control Plan, See Note 2 This Sht. (Phasing Plan 1).

INTERSTATE ROUTE H-1
Outbound Lanes
Inbound Lanes
50+00 55+00 60+00 62+00

EMERGENCY STATE OF HAWAII CALL BOX
EXIT 25 M.P.H.

H1 EAST Honolulu | Makakilo Kapolei Kalaeloa
H1 EAST Honolulu | Wakea St
6' 6' 6' 2'
12' Travel Lane | 12' Travel Lane | 12' Travel Lane

SIGN 8 (EB-0H)
℄ Sta. 58+00 H1 Freeway
Replace Exist. Guide Sign with New Guide Sign, See Guide Sign Det. Sht. SG-27.
YIELD

EXIT 1
Campbell Industrial Park Kalaeloa Barbers Point Harbor

LANCE S. OYAMA LICENSED PROFESSIONAL ENGINEER NO. 5309-C HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
APRIL 30, 2016
WILSON OKAMOTO CORPORATION LIC. EXP. DATE

LEGEND:
- exist sign to remain
- exist sign, sign post ⊕ foundation (2) to be removed
- New Sign (OH or GM)

GRAPHIC SCALE:
100' 50' 0 100' 200'
SCALE: 1" = 100'

ORIGINAL PLAN | NOTE BOOK No.
SURVEY PLOTTED BY DATE
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY

	DATE	REVISION
(2)	5/18/15	Revised Legend

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

OVERHEAD SIGN PLAN

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 2
Federal-Aid Project No. IM-H1-1 (261)

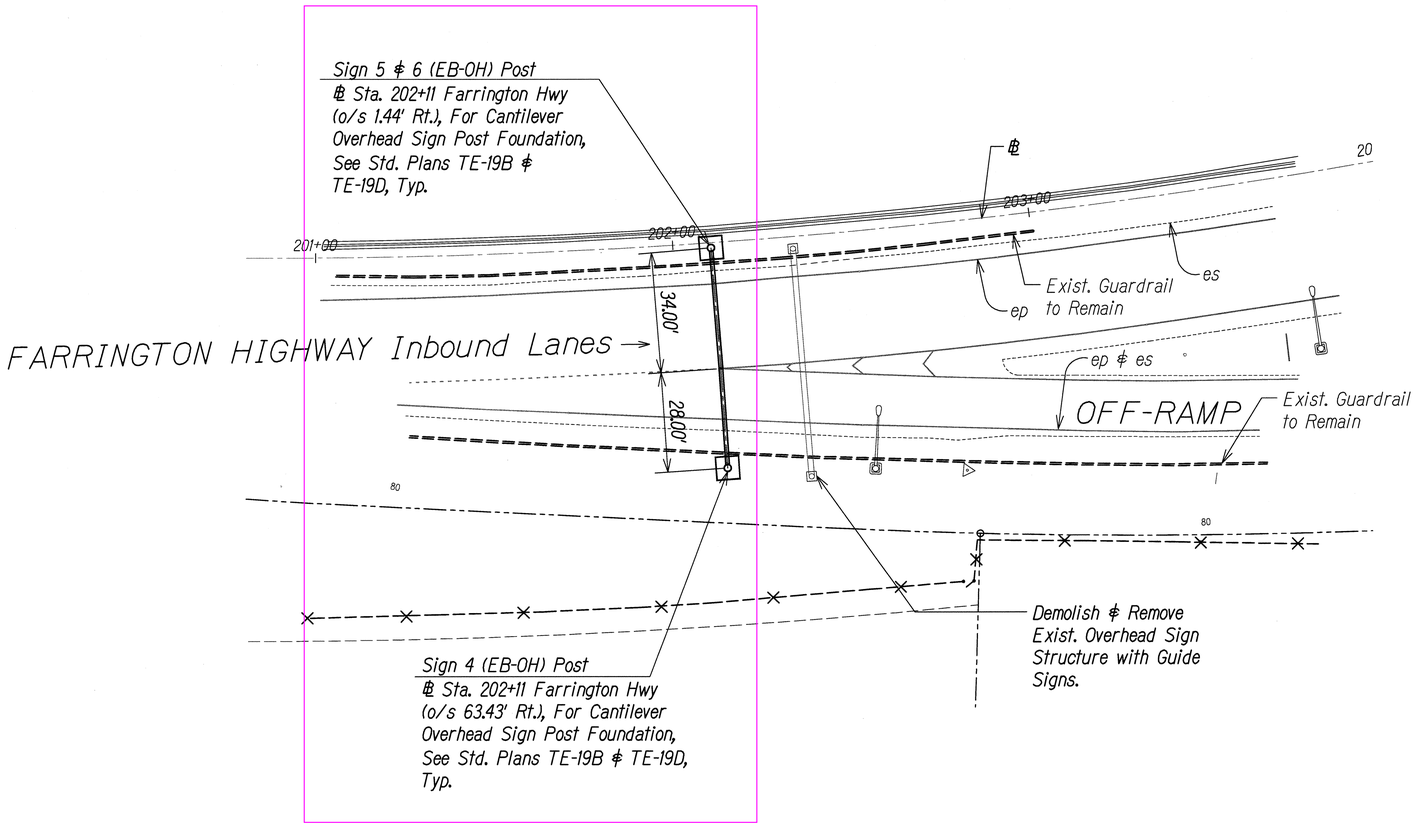
Scale: 1" = 100' Date: January 20, 2015

SHEET No. SG-3 OF 32 SHEETS

ADD. 176

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-HI-1(261)	2015	186	524

TRUE NORTH
SCALE: 1" = 20'



LEGEND:

- exist sign to remain
- exist sign to be removed
- New Sign (OH or GM)

GRAPHIC SCALE:

20' 10' 0 20' 40'

SCALE: 1" = 20'

SITE PLAN - SIGN 4, 5, ℄ 6

SCALE: 1"=20'

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
No.	TRACED BY	
	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

LANCE S. OYAMA
LICENSED PROFESSIONAL ENGINEER
NO. 5309-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

APRIL 30, 2016
WILSON OKAMOTO CORPORATION LIC. EXP. DATE

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

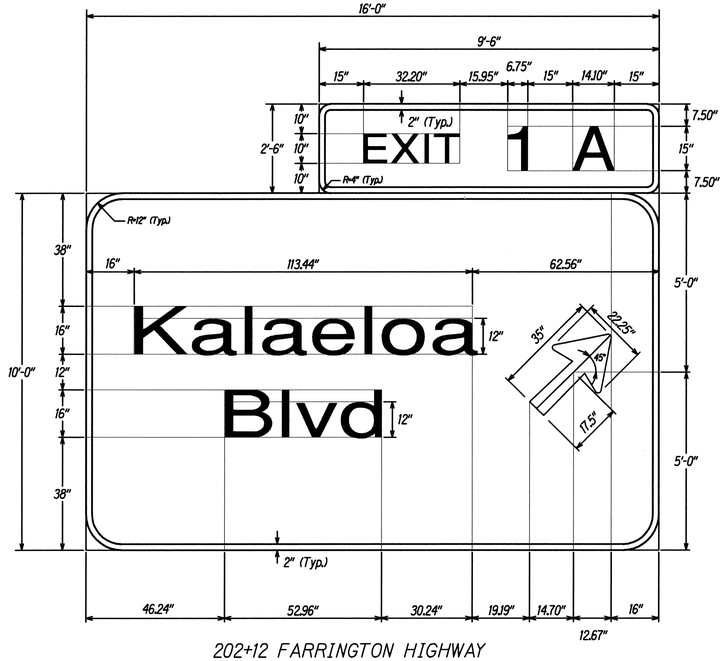
SITE PLAN - SIGN 4, 5, ℄ 6

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 2
Federal-Aid Project No. IM-HI-1 (261)

Scale: 1" = 20' Date: January 20, 2015

SHEET No. SG-13 OF 32 SHEETS

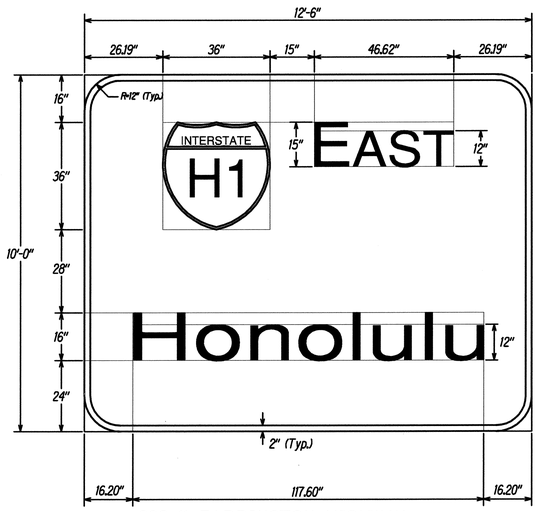
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-HI-1(261)	2015	199	524



202+12 FARRINGTON HIGHWAY

SIGN 4 (EB - OH)

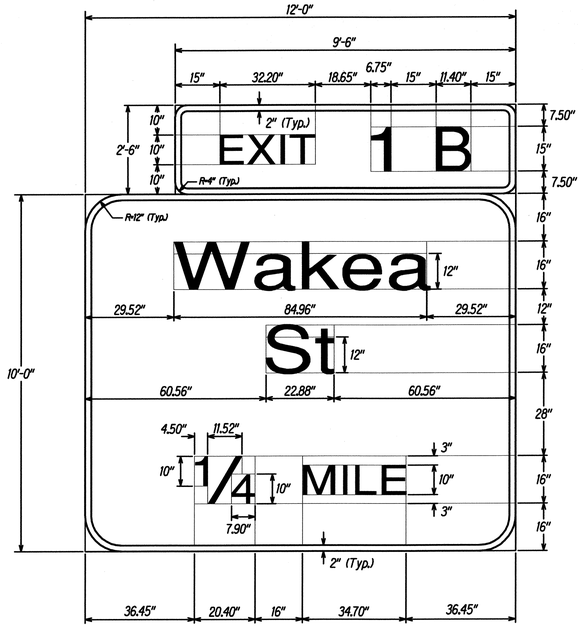
Scale: 1/2" = 1'-0"



202+11 FARRINGTON HIGHWAY

SIGN 5 (EB - OH)

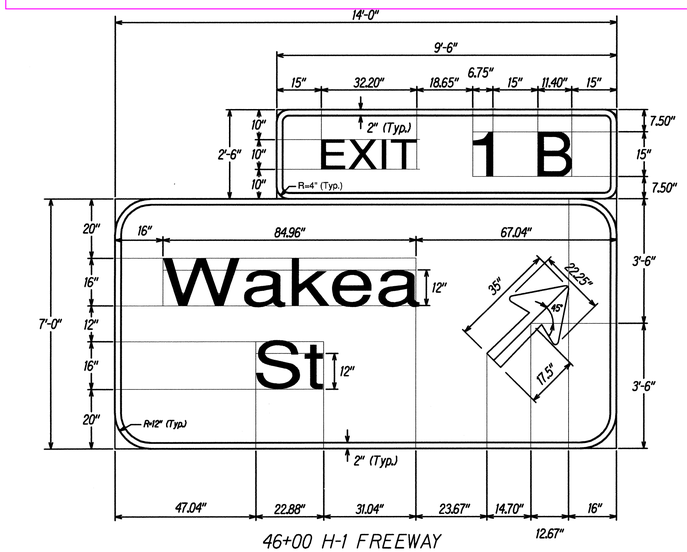
Scale: 1/2" = 1'-0"



202+11 FARRINGTON HIGHWAY

SIGN 6 (EB - OH)

Scale: 1/2" = 1'-0"



46+00 H-1 FREEWAY

SIGN 7 (EB - OH)

Scale: 1/2" = 1'-0"

Notes:

1. *Use Clearview 5-W Alphabets Unless Otherwise Noted.*
2. *Colors: Legend-White (Retroreflective)*
   Background-Green (Retroreflective)

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
NOTE BOOK	TRACED BY	
	DESIGNED BY	
No.	QUANTITIES BY	
	CHECKED BY	

LANCE S. OYAMA
LICENSED PROFESSIONAL ENGINEER
NO. 5309-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Lance S. Oyama

APRIL 30, 2016

WILSON OKAMOTO CORPORATION LIC. EXP. DATE

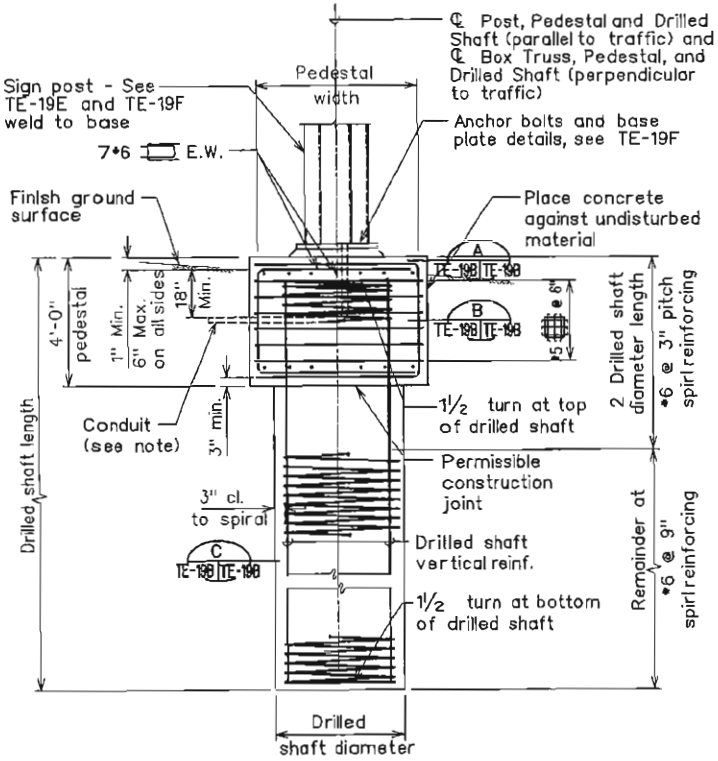
STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SIGN PANEL DETAILS

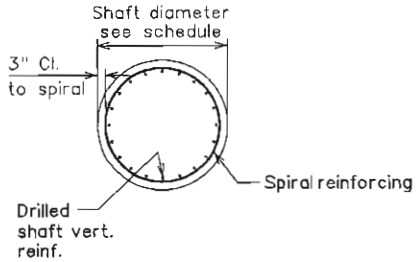
INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 2
Federal-Aid Project No. IM-HI-1 (261)

Scale: 1/2" = 1'-0" Date: January 20, 2015

SHEET No. SG-26 OF 32 SHEETS

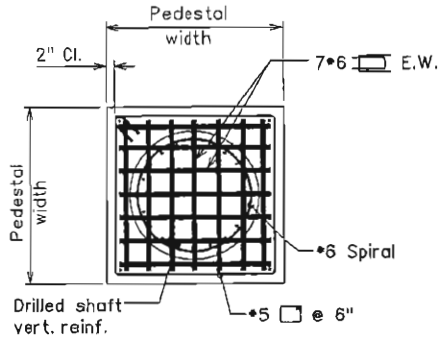


ELEVATION
Note to Scale

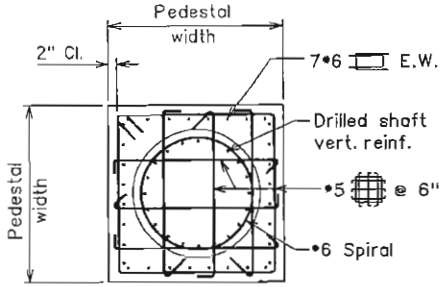


SECTION C
Not to Scale TE-19B TE-19D

Notes:
1. See TE-19D to TE-19D.5 for sign frome foundation schedule.
2. Total number of conduits into pole foundation shall be as indicated on Lighting plans. Conduit shall slope away from pole foundation. Conduit shall stub out 5'-0" minimum.
3. Grounding conductor shall be bonded to sign support as directed by the Engineer.
4. Drilled shaft vertical reinforcing shall be placed so that it does not conflict with the anchor bolts and anchor plates.

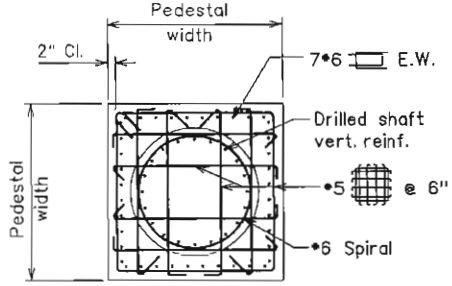


SECTION A
Not to Scale TE-18A TE-19D



5'-6" WIDE PEDESTAL

SECTION B
Not to Scale TE-18A TE-19D



6'-6" WIDE PEDESTAL

TYPICAL SIGN POST DRILLED SHAFT FOUNDATION DETAIL

DATE	REVISION	APP'D.
00/00/00	X	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD PLAN TE-19B

SIGN POST DRILLED SHAFT FOUNDATION

SIGN FRAME FOUNDATION SCHEDULE - FOUNDATIONS IN STIFF CLAY ABOVE THE GROUND WATER TABLE														
Soil Type	Sign Type	DRILLED SHAFT - LEVEL GROUND				DRILLED SHAFT - 2H:1V SLOPING GROUND				SPREAD FOOTING				
		Drilled Shaft			Pedestal	Drilled Shaft			Pedestal	Size			Reinforcing	
		Diameter	Length	Vert. Reinf.	Width	Diameter	Length	Vert. Reinf.	Width	Length "L"	Width "W"	Depth "t"	"x" Bars	"y" Bars
Stiff Clay	I	60"	22'-0"	20-#11	6'-6"	60"	24'-0"	20-#11	6'-6"	11'-0"	8'-0"	4'-0"	#9 @ 12"	#8 @ 12"
		48"	24'-0"	16-#10	5'-6"	48"	28'-0"	16-#10	5'-6"					
	II	60"	24'-0"	20-#11	6'-6"	60"	28'-0"	20-#11	6'-6"	12'-0"	8'-0"	4'-0"	#10 @ 12"	#8 @ 12"
		48"	34'-0"	16-#10	5'-6"									
	III	60"	30'-0"	20-#11	6'-6"	60"	32'-0"	20-#11	6'-6"	13'-0"	10'-0"	4'-0"	#10 @ 12"	#8 @ 12"
	IV	60"	38'-0"	20-#11	6'-6"	60"	38'-0"	20-#11	6'-6"	14'-0"	10'-0"	4'-0"	#10 @ 10"	#8 @ 12"
	V	60"	20'-0"	20-#11	6'-6"	60"	22'-0"	20-#11	6'-6"	12'-0"	7'-0"	3'-6"	#9 @ 10"	#8 @ 12"
		48"	22'-0"	16-#10	5'-6"	48"	26'-0"	16-#10	5'-6"					
	VI	60"	22'-0"	20-#11	6'-6"	60"	24'-0"	20-#11	6'-6"	14'-0"	7'-0"	4'-0"	#10 @ 12"	#8 @ 12"
		48"	24'-0"	16-#10	5'-6"	48"	28'-0"	16-#10	5'-6"					
	VII	60"	24'-0"	20-#11	6'-6"	60"	28'-0"	20-#11	6'-6"	15'-0"	7'-0"	4'-0"	#10 @ 10"	#8 @ 12"
		48"	26'-0"	16-#10	5'-6"									
	VIII	60"	26'-0"	20-#11	6'-6"	60"	30'-0"	20-#11	6'-6"	15'-0"	8'-0"	4'-0"	#10 @ 10"	#8 @ 12"
		48"	30'-0"	16-#10	5'-6"									

Note:
1. See TE-19B & TE-19C for foundation details.
2. Sign called for shall have the foundations for the specific site conditions that exist. Alternate designs shall be stamped by a registered Engineer in the State of Hawaii in each of the related disciplines. The design and drawings shall be submitted to the Engineer for approval.
3. The Contractor may select the size of shaft to build using the corresponding values in the table. If boxes are not filled in, a design for that particular shaft is not available. A special design could be performed. See note 2 for the requirements.

SIGN FRAME FOUNDATION SCHEDULE FOR FOUNDATIONS IN STIFF CLAY ABOVE THE GROUND WATER TABLE

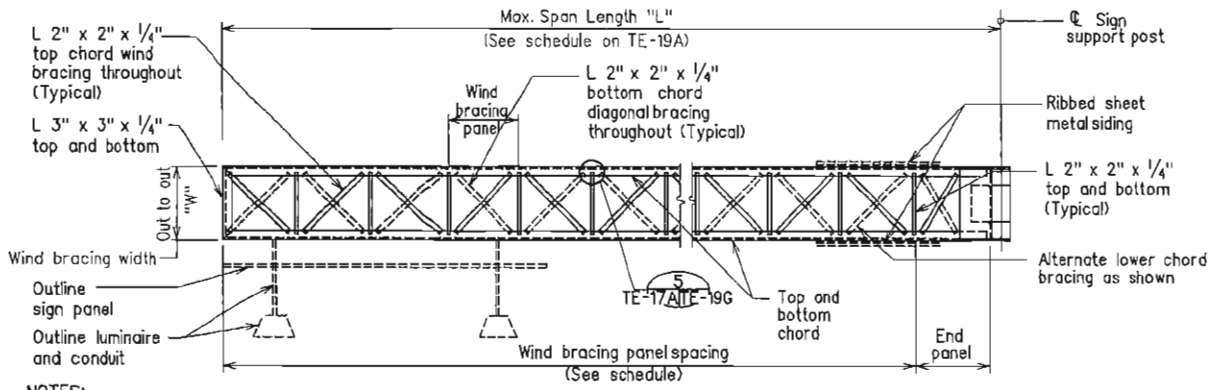
DATE	REVISION	APP'D.
00/00/00	X	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD PLAN TE-19D

SIGN FRAME FOUNDATION SCHEDULE

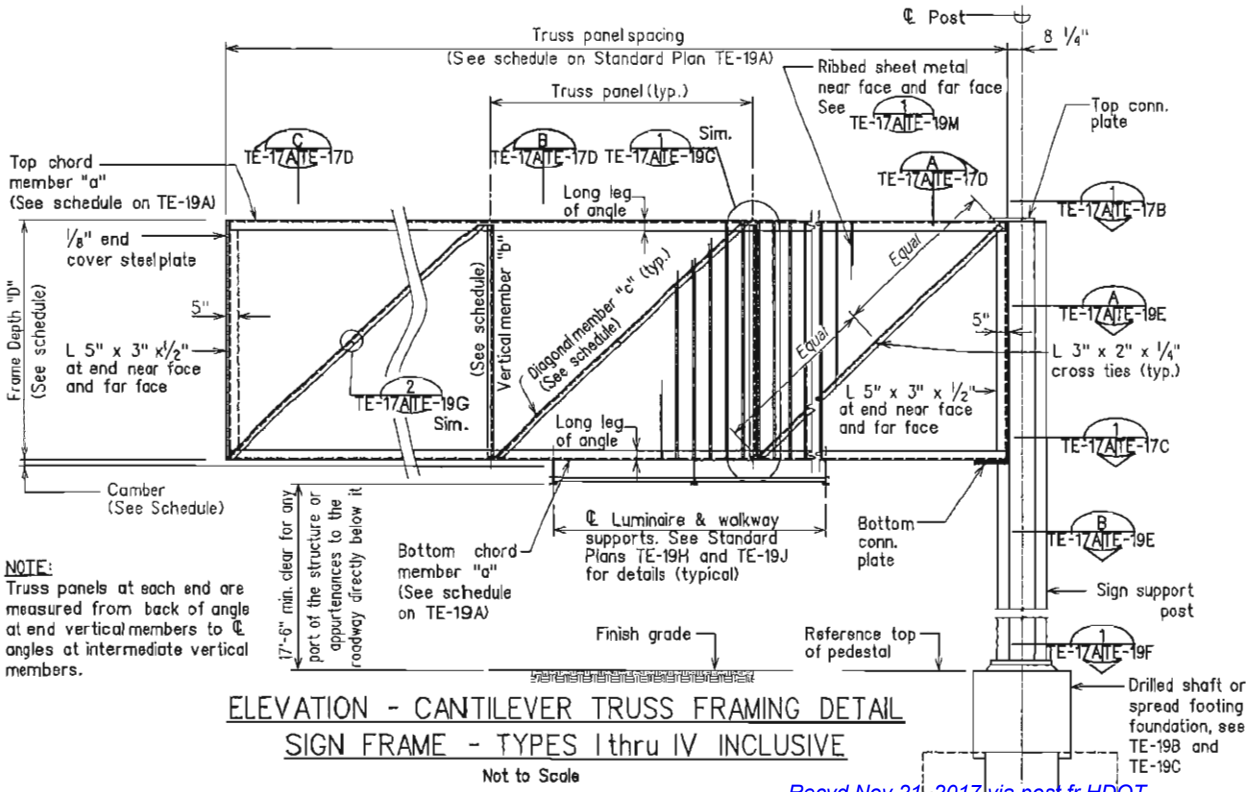
STANDARD PLAN TE-19D 05/31/07



NOTES:
1. See TE-19A for sign frame schedule.
2. For luminaire walkway support details see TE-19H and TE-19J.

TYP. PLAN - TOP AND BOTTOM WIND BRACE FRAMING
SIGN FRAME - TYPES I thru IV INCLUSIVE

Not to Scale



NOTE:
Truss panels at each end are measured from back of angle at end vertical members to ℄ angles at intermediate vertical members.

ELEVATION - CANTILEVER TRUSS FRAMING DETAIL
SIGN FRAME - TYPES I thru IV INCLUSIVE

Not to Scale

GENERAL NOTES

1. Design Specifications:
   (A) Design shall conform w/ the latest AASHTO Standard Specifications for the Structural Supports for Highway Signs, Luminaires & Traffic Signals and its interim supplements and modifications by the Highways Division, Department of Transportation State of Hawaii. Materials & Fabrication shall conform to the requirements of the Standard Specifications & Special Provisions.
   (B) Latest HDOT Memorandum with subject title "Design Criteria for Bridges and Structures."
2. Loads:
   (A) Basic Wind Speed: 105 mph.
   (B) Recurrence Interval of 100 years.
   (C) Fatigue importance factor, IF, shall be based on Fatigue Category I for Sign structures.
   (D) Sign structures shall be designed for a truck induced gust based on a truck speed of 20 MPH over the posted speed.
   (E) Galloping and natural wind gusts shall be considered for cantilevered sign structures.
   (F) Natural wind gusts shall be considered for all sign structures.
3. Materials:
   (A) All concrete strengths shall be as noted below:

Item No.	Structural Parts	Classes of Concrete	Specified Compressive Strength f'c (28 Days)
(1)	Footing and Pedestal	-	4,500 psi

   See specifications for drilled shaft concrete.
   All concrete with a 28 day compressive strength of 4,000 psi or greater shall have a maximum W/C ratio of 0.45.
   (B) All connection bolts shall be AASHTO M164 bolts and anchor bolts shall be AASHTO M314-105 bolt.
   (C) Aluminum members and surfaces in contact with structural steel shall be isolated with neoprene material as approved by the Engineer.
4. General:
   (A) See General Notes on B-01 for additional information.
   (B) Alternate designs in accordance with the plans and specifications shall use the Service Load Design Method and shall be stamped by a registered engineer of the State of Hawaii in the related discipline and submitted to the Engineer for approval.
   (C) All sign support posts shall be outside of the clear zone or shielded by an appropriate traffic barrier system. The traffic barrier system shall be submitted to the Engineer for his approval.
   (D) The Contractor shall use templates while installing the anchor bolts. Anchor bolts shall be vertical.
   (E) Excavation and backfill shall be considered incidental to the cost of the sign foundation.
   (F) Unless otherwise noted all truss members shall be welded all around at joints with 3/16" fillet weld.
   (G) Apply one coat of zinc coated metal primer and three coats of weatherproof dark green enamel over zinc coating conforming to the specifications to all structural steel members. Submit coatings to the Engineer for approval.

DATE	REVISION	APP'D.
00/00/00	X	

STANDARD PLAN TE-17A
CANTILEVER OVERHEAD SIGN ELEVATION & DETAILS